# School of Informatics
# PRAC Annual Report

## Assessment of Student Learning Outcomes
## 2010-2011

**Introduction**

During 2010-211, the School of Informatics completed a two year focused review of its undergraduate programs. In 2009-2010, the School created committees, operating under an umbrella Executive Council for Undergraduate Education (CUE). Those committees were:

1. Teaching and Assessment
2. RISE
3. Graduation Management and Retention
4. Distance Education
5. Recruitment and Marketing
6. Informatics Curriculum Development

The key committee, for purposes of this Report, is the Teaching and Assessment Committee. This committee revised the student course evaluations and created and implemented an online data collection system for those evaluations. In response to the campus initiative to make all student learning outcomes (SLOs) available online, the committee fostered the review/revision of program outcomes for each of the School's degrees and certificates. Updated SLOs have been published.

In both 2009-2010 and 2010-2011, the Teaching and Assessment Committee consulted with the faculty members serving as PRAC committee chairs on the size of the School and the infrastructure necessary to support good assessment processes. As the committee concluded its activities in May 2011, it recommended that assessment activities be lodged with the Informatics Faculty Council's (proposed) Academic Program committee.  This new committee may need subcommittees in order to respond to short term campus requirements prior to the 2012

accreditation. The committee further recommends that the School's representatives to PRAC become members of the oversight committee that continues the work. In addition, the committee recommended that a once yearly discipline-specific workshop on assessing outcomes should be used to embed a culture of assessment in the School.

Finally, the School is undertaking a comprehensive revision of the tools used to track students graduating from the program. Those systems have been largely paper-based and dependent upon face to face contact. It is clear that they need to move online and also appear in the social media that students use during their time at IUPUI and continue to use afterward as they find places in the workforce. There are many data points presented below in this area that are incomplete or insufficient, giving the School an opportunity for improvement next year.

| | Credit Hours* | Degrees Awarded** | Certificates Awarded | Retention*** | Percentage of Under-represented Minorities | Percentage of Female Majors | Grad School Acceptance | Percentage Of Graduates Employed | Average Salary |
|---|---|---|---|---|---|---|---|---|---|
| 2008-2009 | 9795 | 109 | 5 | 85/83.8 | 17.4 | 38.6 | 18.75% | 65% | 24-74 K |
| 2009-2010 | 9405 | 69 | 1 | 84/82.5 | 19.7 | 37 | 17% | 56% | 45,250 |
| 2010-2011 | 10146 | 131 | 8 | 85.5/84.5 | 21.58 | 38.85 | 10% | 69% | 44,799 |

*Credit hours, degrees awarded, certificates awarded, retention, minorities, female majors and, for HIA, registry exam information and percent employed calculated by fiscal year; grad school acceptances, non-HIA percent employed and average salary by academic year
**Students who will complete their degrees in June 2010 are not included.  The School anticipates that 32 undergraduate and six graduate students will finish in June
***The first number represents the fall semester; the second represents the spring semester

| School of Informatics<br>Graduate Program Outcome Measures | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Credit Hours* | Degrees Awarded Masters** | Degrees Awarded PhD | Certificates Awarded | Percentage of Under-represented | Percentage of Female Majors | Percentage of Graduates Employed | Average Salary | PhD Program Acceptances |

| | | | | | Minorities | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2008-2009** | 1677 | 33 | 0 | 1 | 15.9 (44.2) | 33.8 (35.7) | 80% | 23 – 45 K | N/A |
| **2009-2010** | 2074 | 24 | 1 | 1 | 16 (44.9) | 31.8 (32.3) | 77% | 57,750 | N/A |
| **2010-2011** | 2703 | 60 | 4 | 18 | 39.59 | 26.83 | 83% | 48,850 | 3% |

*Credit hours, degrees awarded, certificates awarded, retention, minorities, female majors and, for HIA, registry exam information and percent employed calculated by fiscal year; grad school acceptances, non-HIA percent employed and average salary by academic year

**Students who will complete their degrees in June 2010 are not included.  The School anticipates that 32 undergraduate and six graduate students will finish in June

# Program Specific Assessments for the School of Informatics (SoI)
# UNDERGRADUATE PROGRAMS

| SoI - HIA BS Program | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Degrees Awarded** | **Certificates Awarded** | **Percentage Passing Registry Examination** | **Continued Accreditation** | **Percent Employed** | **Average Salary** | **Grad School Placement** |
| **2008-2009** | 27 | 5 | 61% | Yes | 92.86% | 35 – 45 K | 1 |
| **2009-2010** | 18 | 3 | 50% | Yes | 66% | 42,000 | -- |
| **2010-2011** | 29 | 9 | 82% | Yes | 95.83% | 35-45K | 5 |

**Assessment Project 1**- Improve graduate's proficiency in the Health Information Administration (HIA) Baccalaureate Degree Entry-Level Competencies as outlined by the American Health Information Management Association.

Learning Outcomes:  The Registered Health Information Administrator's (RHIA) examination includes the following domains and the competencies in which the graduate must obtain entry-level knowledge through the (HIA) program curricula:

- Domain I - Health Data Management – which includes Health Data Structure, Content and Standards, Healthcare Information Requirements and Standards, Clinical Classification Systems and Reimbursement Methodologies

- Domain II- Health Statistics, Biomedical Research and Quality Management – which includes Healthcare Statistics and Research and Quality Management and Performance Improvement
- Domain III - Health Services Organization and Delivery – which includes Healthcare Delivery Systems and Healthcare Privacy, Confidentiality, Legal and Ethical Issues
- Domain IV:  Information Technology & Systems – which includes Information and Communication Technologies, Data, Information, and File Structures, Data Storage and Retrieval, Data Security and Healthcare Information Systems
- Domain V:  Organization and Management which includes - Human Resources Management, Financial and Resource Management, Strategic Planning and Organizational Development and Project and Operations Management

PRAC Questions:

**a)  What general outcome are you seeking?**
To improve HIA graduate scores on the national RHIA credentialing examination.
**b)  How would you know it (the outcome) if you saw it?  (What will the student know or be able to do?)**
Students will maintain RHIA examination scores at or above the national average on all domains and competency areas.
**c)  What opportunities do students have to learn it? ( in class or out of class)**
Through successful completion of course curricula which is determined by the American Health Information Management Association's Model Curriculum for Baccalaureate Degree Program.
**d)  How are you measuring each of the desired behaviors listed in (b.)?**
1. Through ongoing analysis of registry examination results that are included on the American Health Information Management Association's School Score Report.  This report is forwarded to the HIA Program Director on a quarterly basis.
2. Through ongoing assessment of course content during the HIA annual program evaluation conducted by the HIA faculty in May of each year.  This assessment is ongoing and is a requirement for accreditation through our accrediting body the Commission on Accreditation for Health Information and Informatics Management Education (CAHIIM).

**e)  What are the assessment findings?**
An analysis of the RHIA examination results from Indiana University graduates indicates an improvement in examination scores in all but two of the required domains.  NOTE:  The HIA Program Director reports annually to the accrediting body, CAHIIM on a report called the Annual Program Assessment Report (APAR).  This report contains aggregate data that has been collected from all other HIA baccalaureate programs allowing directors to compare their program results to other programs across the nation.

Based on aggregate data from the most current APAR the national RHIA examination results from the time period of 10-01-09  through  09-30-2010 indicates that Indiana University graduates surpassed the American Health Information Management Association's (AHIMA) national mean passing rate.  The AHIMA's national passing rate was 78% for this time period and our program's passing rate was 82%.  This is a good indicator

of our programs performance, however continued assessments must be made to improve graduate scores in the domains in which graduates scored below the national average.

**f)  What improvements have been made based on assessment findings?**
The following required prerequisite courses have been developed for the pre-HIA Plan of Study:
   1) HIA M 210 Data Organization and Presentation in the Healthcare Environment;
   2) HIA M 220 Healthcare Decision Support; and
   3) HIA M275 Professional Interaction in the Healthcare Environment.

These courses were developed to enhance the student's skill set in data organization, report writing and written communication skills.  All are necessary for HIA students to be successful in a healthcare environment and improve the domain scores.

The following courses have been added to the professional program's Plan of Study as well:
   1) HIA M327 Healthcare Information Standard and Requirements II;
   2) HIA M328 – Laboratory Enrichment for Healthcare Information Standard and Requirements II.

These two courses have allowed faculty to focus the first semester on acute care requirements and the second semester on alternative care requirements, thus enhancing the student's skill set in the areas within the lower scoring domains.

**Assessment Project 2** - Graduate employment performance

Learning Outcomes:  Graduates of the HIA program should be proficient in the following areas:
   1. Knowledge Base – Cognitive Domain
   2. Practice Proficiency – Psychomotor Domain
   3. Behavioral Skills – Affective Domain

**a)  What general outcome are you seeking?**
Employers of HIA graduates either, generally agree or strongly agree that the students are proficient in the above outlined areas.  This information is gathered through the use of an online survey forwarded to employers of recent HIA graduates.

**b)  How would you know it (the outcome) if you saw it?  (What will the student know or be able to do?)**
Students will demonstrate their knowledge through critical thinking, time management, technical and problem solving techniques necessary to function in a Health Information Management (HIM) department.

Each year an Employer Survey is sent to employers of recent HIA graduates.  Surveyed employers rate on the following learning outcome scale:
5 = Strongly Agree
4 = Generally Agree
3 = Neutral (acceptable)

2 = Generally Disagree
1 = N/A Not Applicable

**c) What opportunities do students have to learn it? ( in class or out of class)**
Students gain knowledge through the HIA course curricula including examinations, homework, and hands-on projects.
**d) How are you measuring each of the desired behaviors listed in (b.)?**
Behaviors are measured through the results of the Employer Surveys.
**e) What are the assessment findings?**
Based on the results from the most recent survey administered in January 2011, the overall rating was a 5 which indicates that the employers strongly agree that our graduates are proficient in the Learning Outcomes listed above.
**f) What improvements have been made based on assessment findings?**
The survey indicates that our graduates are proficient in the areas needed to be successful within a HIM department. There were, however, three areas in which the respondents only "generally agreed" that the students were proficient. Activities will be added to the course curriculum which incorporates more problem solving and time management skills to improve respondent results in these areas.

**Assessment Project 3**- The Health Information Administration assessment focuses on the course, Professional Practice Experience (PPE) – which includes the following two courses taken during the HIA student's senior year:
        1) HIA M443 – Professional Practicum in Health Information Management I;
        2) M444 – Professional Practicum in Health Information Management II.

These courses are designed to provide professional practice experiences to the students in an approved clinical site under the direction of an HIA faculty member and an onsite professional practice instructor. Students also receive didactic and practicum experience in the classroom. Throughout these courses emphasis is placed on clinical science, health information management, and business administration and information systems.

Learning Outcomes:
1. PPE In-Class Practicum Outcomes
   - Application of the technical and administrative skills necessary to function in health information management profession.
   - Application of common health information management techniques and practices in actual clinical setting.
   - Application of common quality improvement techniques and practices in simulated settings.
   - Use of effective writing techniques on assignments.
   - Ability to quantitatively analyze data which are commonly utilized by the health information profession.

2. PPE Site Facility Visit Outcomes

- Ability to apply didactic knowledge in the professional practice setting in the following areas;  CPT coding, quality improvement, hospital planning and systems, computer applications, seminar and in-service, long term care, alternate delivery systems, healthcare reimbursement and psychiatric record systems.
- Application of common health information techniques and practices in simulated settings.
- Application of the technical and administrative skills necessary to function in health information services area.
- Ability to communicate clearly and effectively with diverse populations, including students, practitioners and clinical instructors.
- Ability to quantitatively analyze data which are commonly utilized by the health information profession.

PRAC Questions:

**a) What general outcome are you seeking?**

The general outcome of these two courses are to enable students to communicate clearly and effectively with diverse populations, incorporate ethical decision-making, and participate in activities which affect social and professional policies.

**b) How would you know it (the outcome) if you saw it?  (What will the student know or be able to do?)**

- Students will demonstrate the ability to communicate clearly and effectively with diverse populations, including students, faculty and guest lecturers.
- Use effective writing techniques on all assignments.
- Learn to be flexible by accommodating changes in plans and managing multiple concurrent assignments.
- Demonstrate ethical decision-making into practical experiences.
- Commit to abiding by the ethical standards of the health information profession.
- Use information technology by utilizing PowerPoint and other visual aids when making presentations to fellow students and faculty.
- Commit to academic honesty.
- Demonstrate their ability to critique professional literature
- Analyze rationales for reliability and validity
- Conduct literature reviews, collect data, analyze data and present results.

**c) What opportunities do students have to learn it? ( in class or out of class)**

Students will learn many of the outcomes while at the healthcare facility they are assigned to and also during the in-class practicum in the classroom with the HIA faculty.

**d)** How are you measuring each of the desired behaviors listed in (b.)?

- During the in-class practicum students are required to complete in-class discussions regarding their previous facility visit and complete assigned projects relevant to the previous facility visit.
- During the facility visits students are required to complete Task, Inquires and a Narrative Summary of the unit(s) assigned for that visit.  This information is then reviewed for content to ensure the student received the information and knowledge intended for that visit.

**e) What are the assessment findings?**

The completion of each unit depends on the facility a student is assigned to.  For example, not many facilities have a Cancer Registry; therefore the student cannot complete the requirements for this unit.  Revenue Cycle is another area in which students may or may not get to complete the required elements of the unit.

**f) What improvements have been made based on assessment findings?**

Based on student feedback the following will be continued for the in-class practicum of the PPE:

- Sharing experiences at the beginning of class
- No homework outside of the in-class PPE sessions
- Group work "sprinkled with" individual assignments
- Groups of 3-4 people
- Instructor feedback (i.e. instructor completes the same assignment/project as students so students can see how the instructor approached the assignment/project; give feedback during the in-class PPE session instead of when grading in Oncourse)
- Requiring all students to attend in person
- Use of Diigo
- Learning how to use new tools
- Showing students how to do something new
- Instructors sharing resources with students

Things that may be eliminated include:

- Writing assignments
- Groups of 1 or 2 students
- Research (students would like more hands-on activities)

Projects for 2011/2012

Assessment Project 1- Improve graduate's proficiency in the Health Information Administration (HIA) Baccalaureate Degree Entry-Level Competencies as outlined by the American Health Information Management Association

Assessment Project 2 – Improve student's scores on the Mock Registry examination.

Assessment Project 3 – Assess the new PPE model and student's satisfaction rate on knowledge learned and how it applied to their employment.

## SoI – Informatics BS Program

|  | Degrees Awarded | Certificates Awarded | Percent Employed | Average Salary | Grad School Acceptances |
|---|---|---|---|---|---|
| 2008-2009 | 16 | 0 | 64% | 24 – 74 K | 29% |
| 2009-2010 | 12 | 0 | 86% | 42,000 | 14% |
| 2010-2011 | 23 | 0 | 75% | 64,896 | 13% |

**Assessment Project 1: I101 Introduction to Informatics**

a) **What general outcome are you seeking?**

The general goal in this project was to chart the progress of students in I101. This meant measuring whether students were acquiring the foundations provided of this entry level course. There are three components to this foundation including:

- Being able to identify what the discipline of Informatics means to them
- Developing an initial level of comfort with the various tools and techniques taught in the class
- Help students acquire a 100 level understanding of the Informatics student learning outcome: "Demonstrate the ability to deploy IT resources in the context of another domain and/or discipline"

b) **How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

- Improved confidence in students' abilities to master course content.
- Students' ability to define Informatics and to identify its application in various domains.
- Increased awareness by students of the role they would like to have in the field of Informatics.

c) **What opportunities do students have to learn it? (in class or out of class)**

- Students explore course content related to the field of Informatics and domains of application.
- Students discuss concepts underlying supporting technologies of Informatics as well as engage with those technologies through application-based laboratory work.
- Students gauge their understanding of the field through the semester using a time capsule, which records initial sentiments regarding Informatics.
- To pair with this activity, students participate in several blog posts throughout the semester to structure the process of applying Informatics technologies to domains and problems of interest. These blog activities include a final, reflective blog post to summarize the semester and to compare student's sentiments and knowledge of the field with that of the sentiments they described in the time capsule.

d) **How are you measuring each of the desired behaviors listed in #2?**

- The time capsule assessment was conducted at the start of the semester before the class began. Students were given a sheet with a list of open-ended questions they needed to complete. Then, they placed the completed questionnaire in an envelope, sealed it, and signed it. The letters were collected. At the end of the semester, students received the

questionnaire they completed and were asked to respond to changes in the questions at the end of the semester through a blog entry.

e) Pre- and post-surveys for selected modules in the course allowed students to self-assess their levels of comfort, confidence, and perceived ability with the various tools and techniques taught in class. The surveys were given before selected modules. At the end of those modules, the students were given the same survey that they completed before the module (e.g., there may be one class session between assessments or many class sessions between assessments). The modules assessed included Computer Architecture, Algorithms, Databases, and Programming in that order. Each module included 4 5-point Likert scale questions about whether they agreed or disagreed with statements related to their comprehension of module material. A value of 1 was strongly agree, whereas a value of 5 was strongly disagree.

f) **What are the assessment findings?**

- The five-point Likert scales were averaged for each of the pre- and post- surveys for each module. Using a t-test comparison on the averages for each individual, significant differences were found between the pre- and post- surveys for each module.
  - Computer Architecture: pre: $\mu=1.97$, $\sigma=0.59$; post: $\mu=1.63$, $\sigma=0.47$; $p<0.05$
  - Algorithms: pre: $\mu=2.43$, $\sigma=0.85$; post: $\mu=1.47$, $\sigma=0.51$; $p<0.001$
  - Databases: pre: $\mu=3.71$, $\sigma=0.57$; post: $\mu=1.88$, $\sigma=0.43$; $p<0.005$
  - Programming: pre: $\mu=3.14$, $\sigma=0.68$; post: $\mu=1.83$, $\sigma=0.42$; $p<0.005$
- Through comparing the time capsule with the final blog post (of which 7 students completed both), the following was discovered:
  - In terms of their identification and definition of Informatics:
    - Two students described no change in their definition
    - One student mentioned a change, but did not articulate how it changed.
    - Three students mentioned changes in the way they think about Informatics by acknowledging the role people or society hay in information technology.
    - One student mentioned changes in the way they think about Informatics by acknowledging the role data has in informatics.
  - By the end of the semester, six students were able to identify six different areas in which they wanted to specialize by the end of the semester (e.g., computer information technology, games, HCI, programming, business, and security).
  - The following interesting topics were described in the final blog post that were not described in the time capsule:
    - Educating and helping others in IT
    - Human component of computing
    - Use of data and how it is displayed
    - The convergence of technology and society
  - Students comment on the following things that they liked about the class:
    - Always having interesting activities in class and making a 3 hour class that "always flew by"

- ▪ Individual attention received because of small class size
- ▪ Group discussions
- ▪ Lab work
- ▪ Being "treat[ed] like family"

**g) What improvements have been made based on assessment findings?**
- • Nothing at this time.
- • Plans have been made to create activities to improve student's ability to articulate their definition of Informatics. The first attempt will be to ask more focused questions about that definition in the final blog post.
- • Additionally, a learning game is being created to help students understand the different domains of Informatics.

**Assessment Project 2: Improving Critical Thinking in I202, Social Informatics**

**a) What general outcome are you seeking?**
Students in I202 have a writing assignment in I202 which requires them to select a segment of the economy and identify:
- a. how information technology has affected that industry (both positives and negatives)
- b. how information technology has affected the consumers of that industry (both positives and negatives) and
- c. how information technology has affected the workers in that industry (both positives and negatives)

Improvement student learning on an I202 assignment which addresses:
- • The PUL Critical Thinking
- • The Informatics SLO "Critically analyze the intended and unintended consequences of IT on individuals, groups, formal and informal organizations at local and global levels"

**b) How would you know it (the outcome) if you saw it?  (What will the student know or be able to do?)**
Overall class scores will improve on attainment of this PUL and SLO from 2010 to 2011
- • 6.6 percent of student in the 2010 attained a rating of Very Effective in 2010
  36.6 percent of the students in the 2010 class attained a rating of Effective in 2010
- • 33.3 percent of the students in the 2010 class attained a rating of Somewhat Effective in 2010
- • 23.3 percent of the students in the 2010 class attained a rating of Effective in 2010

**c) What opportunities do students have to learn it? (in class or out of class)**
A specific intervention was designed to raise attainment of related skills in 2011. There were three elements to the intervention:
- • The rubric for the assignment was posted on the first day of class and the assignment explained at that time
- • The due date for the end of the assignment was moved to the end of the semester, to give students more time to acquire a balanced view of the course material (allowing them exposure to class discussion that highlighted positive and negatives of IT implementation

- Six weeks before the end of class, a new in-class group exercise (25 minutes) was added to class; students worked in small groups to "rehearse" the assignment by generating a list of how information technology has affected the newspaper industry, its consumers and individuals working in that industry

**d) How are you measuring each of the desired behaviors listed in (b.)?**
The same rubric was used in 2010 and 2011. It is a two page rubric that assess each paper on eight dimensions (responding to the three elements of the assignment, plus assessment of the paper's introduction, conclusion, integration of class material, accuracy and general organization

**e) What are the assessment findings?**
Overall class scores will improve on attainment of this PUL and SLO from 2010 to 2011
- 37.5 percent of student in the 2010 attained a rating of Very Effective in 2010
- 21.0 percent of the students in the 2010 class attained a rating of Effective in 2010
- 12.5 percent of the students in the 2010 class attained a rating of Somewhat in 2010
- 29.1 percent of the students in the 2010 class attained a rating of Not Effective in 2010

**What improvements have been made based on assessment findings?**
While these results point in a somewhat positive trend into very effective and effective, further intervention is needed. Will add an additional assignment next year that presents a finished paper and asks students to review it, identifying and labeling what constitutes a positive impact or a negative impact on the industry, workers and consumers.

| SoI - Media Arts and Science BS Program | | | | |
|---|---|---|---|---|
| | Degrees Awarded | Percent Employed | Average Salary | Grad School Acceptances |
| 2008-2009 | 66 | 68% | 42,223 | 20% |
| 2009-2010 | 55 | 49% | 50,667 | 20% |
| 2010-2011 | 80 | 67% | 38,100 | 13% |

1. Results of 2010-2011 assessment projects

**A. Assessment Project: First-Year Student Portfolios**

In this project, we incorporated a requirement for first-year students to create personal Websites where they demonstrate newly developed skills for creation of media-rich content.  The project is intended to provide an on-line portfolio where students can showcase their skills and experiment with ways to communicate about themselves, their interests, and their expertise.  Specifically, these sites provide information on students' ability to (1) demonstrate skill in the discipline (PUL 4), and (2) use their Website to communicate about themselves (PUL 1A).From a program assessment point of view, these sites can also provide important baseline information about students' skills at the end of their first-year courses, which can be used in comparisons with work produced as students progress through the program.

**a. What general outcome are you seeking?**
Students are able to communicate about their background and interests through a basic Web site (PULS 4 and 1A).

**b. How would you know it if you saw it? What will the student know or be able to do?**
The student will use digital tools to generate content, present that content in a site constructed with current Web technologies, in a manner that reflects a basic understanding of Web usability.

**c. What opportunities do students have to learn it?**
The introductory classes, including N101 and N102, introduce content-creation skills, as well as guidelines for Web design and usability.

**d. How are you measuring each of the desired behaviors listed in (a)?**
A detailed rubric is used to assess each student's product.

**e. What are the assessment findings?**
Of the 56 students in the course in the spring of 2011, 50% of the sites earned a grade of B (80%) or better.  Another 14% of the students earned a C, and a handful of students earned a D.  Of some concern, 23% of the students did not complete the task of creating a Website.

**f. What improvements have been made based on assessment findings?**
The fact that 50% of the students did reasonably well on this task confirms that this requirement serves its purpose in terms of student learning and engagement.  Based on this, we will extend this practice to include an additional first-year class (N102).

The large number of students who did not complete the task is a concern.  We will address this next year in these ways:  (1) introduce the requirement early in the course, so that it becomes an ongoing activity, (2) periodically highlight the best sites, and (3) provide additional support materials (videos, e.g.) regarding the mechanics of getting sites established.

**B.       Assessment Project: Capstone Websites**

In the MAS program, students produce a final project as the capstone of their academic career in the class NEWM-N499.  As part of this endeavor, students create a Website to describe their experience and the finished product.  In this ongoing assessment project, we evaluate students' ability to produce these Websites (PUL 3) and use them effectively to communicate (PUL 1A) about their Capstone project.   It is our goal that MAS students are able to present a synopsis of their project and explain why it's interesting.  Further, they should be able to describe their production process, note the challenges they faced, and share reflections on what they learned.

**a. What general outcome are you seeking?**
Students are able to create a public Web site that communicates about their Capstone project and their future plans (PULS 3 and 1A).

**b. How would you know it if you saw it? What will the student know or be able to do?**
The student will produce multi-media material to document their project and present this material through a Website.

**c. What opportunities do students have to learn it?**
Various courses throughout the program, starting at the 100-level, prepare them for this task.

**d. How are you measuring each of the desired behaviors listed in (a)?**
Currently, we are looking at task-completion rates and very basic metrics for quality.  We intend to extend this to additional measures in the future.

**e. What are the assessment findings?**
Of the 24 students graduating in the fall of 2010, only half created full Websites.  However, of the 51 students graduating in the spring of 2011, 39 (76%) created full-functioning, effective Websites to communicate about their project.  An additional 4 students created reasonably complete sites.  The remaining 8 students (16%) made minimal or no effort to complete this task.  Of the spring 2011 students who created full-functioning sites, 75% had completed the task by the dates requested.  Of the sites that were completed, the majority of sites met the basic standards for writing quality.

**f. What improvements have been made based on assessment findings?**
Based on the low participation rate in the fall, we changed the way we communicated with students about this task, which resulted in much better task-completion rate in the spring.  The fact that some students find this task difficult reinforces our earlier curricular decision to introduce personal portfolios (both as technology and communication medium) as early as the 100-level classes.  Further, the high participation rate we observed in the spring implies that we can design additional assessment projects using the Capstone Websites as a vehicle.

2.   Projects for the coming year

**A. Assessment Project: First-Year Student Portfolios (continuing)**

In this ongoing assessment project, we will continue to evaluate the requirement for first-year students to create personal Websites.  These sites are intended to address specific learning outcomes related to students' ability to (1) demonstrate skill in the discipline (PUL 4), and (2) use their Website to communicate about themselves (PUL 1A).

Based on findings in 2010-2011, we will address the substantial number of students who did not do well on this task.  Specifically, we will:  (1) introduce the requirement early in the course, so that it becomes an ongoing activity, (2) periodically highlight the best sites, and (3) provide additional support materials (videos, e.g.) regarding the mechanics of getting sites established.

    a.   **What general outcome are you seeking?**
All, or almost all, students are able to communicate about their background and interests through a basic Web site (PULS 4 and 1A).

    b.   **How would you know it if you saw it? What will the student know or be able to do?**
Students will use digital tools to generate content, present that content in a site constructed with current Web technologies, in a manner that reflects a basic understanding of Web usability.

    c.   **What opportunities do students have to learn it?**
The introductory classes introduce content-creation skills, as well as guidelines for Web design and usability.  These classes will also be modified as described above.

    d.   **How are you measuring each of the desired behaviors listed in (a)?**
A detailed rubric is used to assess each student's product.

    e.   **What are the assessment findings?**
Deferred until project completion.

    f.   **What improvements have been made based on assessment findings?**
Deferred until project completion.


    B.   **Assessment Project: Capstone Websites (continuing)**

In this ongoing assessment project, we will continue to use the Capstone Websites as a vehicle to assess students' ability to use the medium to communicate about their Capstone projects.  In this next phase of the project, we will expand the feature set we use to assess students' communication skills.

**a.  What general outcome are you seeking?**
Students are able to create a public Web site that communicates about their Capstone project and their future plans (PULS 3 and 1A).

**b.  How would you know it if you saw it? What will the student know or be able to do?**
The student will produce material to document their project and present this material through a Web site.

**c.  What opportunities do students have to learn it?**
Various courses throughout the program, starting at the 100-level, prepare them for this task.

**d.  How are you measuring each of the desired behaviors listed in (a)?**
A group of faculty evaluators will develop a rubric for evaluating the students' communication skills, and apply it to the student sites.

**e.  What are the assessment findings?**
Deferred until project completion.

**f.  What improvements have been made based on assessment findings?**
Deferred until project completion.

**C.  Assessment Project: Pre-Capstone Planning (new)**

In the MAS program, students produce a final project as the capstone of their academic career.  Ideally, students develop a project idea that simultaneously showcases their skills, incorporates some new challenge, and is doable in the timeframe of one semester.  In earlier program assessment exercises, we had observed that some students have trouble hitting this ideal.  In the 2010 Curriculum re-design, MAS faculty added a new course (N420) designed to target this issue.

**a.  What general outcome are you seeking?**
Students are able to generate suitable project ideas, analyze the requirements of each candidate project, conduct feasibility studies or otherwise research the idea, choose an appropriate project, and develop a project plan.

These outcomes require critical thinking (PUL 2), intellectual depth and breadth (PUL 4), and the ability to apply what has been learned (PUL 3).

Further, these outcomes relate to the MAS program goals related to problem analysis (Goal 4), demonstrating mastery (Goal 3), and applying knowledge to develop professional quality media products in a timely manner (Goal 5).

**b. How would you know it if you saw it? What will the student know or be able to do?**
Students are able to articulate why they chose a particular project, and can execute on their project plan.

**c. What opportunities do students have to learn it?**
Several other courses in the MAS program target project management and the learning of specific skills.

**d. How will you measure each of the desired behaviors listed above?**
The course instructor, with faculty colleagues, will assess students' plans. Students will also complete a questionnaire at the beginning and end of the semester addressing their readiness to undertake their capstone project. Finally, external observers will rate the completed projects, assessing each one on feasibility, challenge, and overall quality.

**e. What are the assessment findings?**
Deferred until project completion.

**f. What improvements have been made based on assessment findings?**
Deferred until project completion

# Program Specific Assessments for the School of Informatics (SoI)

# GRADUATE PROGRAMS

| SoI – Human-Computer Interaction MAS Program | | | | | |
|---|---|---|---|---|---|
| | Degrees Awarded | Certificates Awarded | Percent Employed | Average Salary | Ph.D. Acceptances |
| 2008-2009 | 5 | 1 | 80% | NR | 20% |
| 2009-2010 | 6 | 1 | 86% | 53,667 | 14% |
| 2010-2011 | 21 | 18 | 80% | 60,000 | -- |

**Assessment Project 1: Review of course I541 (Human-Computer Interaction I), Fall 2010 Edition**

**a) What general outcome are you seeking?**

The course objectives of this course will include each graduate student acquiring the following:

Related to obtaining *knowledge about HCI*, students will explain, recognize, and apply with considerable depth:

- Basic HCI theory, terms, principles, and conceptual models
- User Experience, User-centered design theory and practices related to interaction design
- Product design and development processes and life-cycle
- User profiling to interaction design (needs and requirements)
- System requirements and product assessments
- Interface design principles and processes
- Prototype design basics: theory and practice
- Product usability evaluations and testing methods

Related to applying HCI theory to product development, students will:
- Apply HCI principles and a user-centered approach to interaction design
- Analyze user needs and requirements
- Design and develop prototypes based on user assessments (needs and requirements), while applying HCI principles and models.
- Apply evaluation and usability testing methods to interactive products to validate design decisions

Communication skills:
- Being able to communicate effectively (aurally, visually and in written form) design alternative for interactive systems, design concepts, design ideas, and reasons behind design decisions

**b) How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

Students will demonstrate that the planned learning objective in (1) will be achieved if the following criteria are met:

- Above 85% grade point obtained on quizzes and discussion points on HCI theory (main textbook and related resources)

- Above 80% grade point obtained on midterm and final project report
- Above 90% grade point obtained on midterm and final project class presentation

**c) What opportunities do students have to learn it?**

Students will have the following opportunities to demonstrate to have achieved the expected learning outcomes:

1. Weekly Quizzes on the Textbook
2. Class Participation (individual)
3. Weekly contribution to group project (individual)
4. Midterm Team Presentation
   4a. Midterm Project Presentation (individual contribution)
   4b. Midterm Project Presentation (group)
5. Final Team Presentation
   5a. Final Project Presentation (individual contribution)
   5b. Final Project Presentation (group)
6. Team Midterm Project Report
7. Team Final Project Report

**4. How are you measuring each of the desired behaviors listed in #1?**

The three pillars of learning outcomes identified in (1) measured by specific student's performances based on the course assignments, outlined in (3), and structured as follows:

*Knowledge and Understanding Competences* are measured by the weighted grades from:

- Written Discussion Points (30%)
- Midterm Project Presentation [individual] (20%)
- Midterm Project Presentation [individual] (15%)
- Final Project Presentation [individual] (20%)
- Final Project Presentation [individual] (15%)

*Application of Knowledge* is measured by the weighted grades from:

- Weekly project contribution (30%)
- Midterm Project Report (35%)
- Final Project Report (35%)

*Communication Competences* are measured by the weighted grades from:

- Midterm Project Presentation [individual] (40%)
- Midterm Project Presentation [individual] (10%)
- Final Project Presentation [individual] (40%)
- Final Project Presentation [individual] (10%)

## 5. What are the assessment findings?

The findings indicate that I541 students (N=22) have achieved a very high standard of learning performance in all three pillars evaluated: knowledge & understanding (average of 8.98 out of 10), application of knowledge (9.41 out of 10) and communication competences (9.35 out of 10), with very low variation from the average (see Figure 1).

| Student | 100% Knowledge & Understanding Competences (1-10) | 30% Written Discussion Points on Readings & Class participation | 20% Midterm Project Presentation (individual | 15% Midterm Project Presentation (group) | 20% Final Project Presentation (individual contribution) | 15% Final Presentation (group) | 100% Application of Knowledge Competences (1-10) | 30% Weekly project contribution | 35% Midterm Project Report | 35% Final Project Report | 100% Communication Competences (1-10) | 40% Midterm Project Presentation (individual contribution) | 10% Midterm Project Presentation (group) | 40% Final Project Presentation (individual contribution) | 10% Final Presentation (group) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| student 1 | 9.17 | 100.00 | 96.29 | 95.00 | 94.00 | 94.00 | 9.58 | 96.29 | 96.29 | 95.00 | 9.50 | 96.29 | 95.00 | 94.00 | 94.00 |
| student 2 | 8.13 | 65.45 | 96.29 | 95.00 | 94.00 | 94.00 | 9.58 | 96.29 | 96.29 | 95.00 | 9.50 | 96.29 | 95.00 | 94.00 | 94.00 |
| student 3 | 9.14 | 99.09 | 96.29 | 95.00 | 94.00 | 94.00 | 9.58 | 96.29 | 96.29 | 95.00 | 9.50 | 96.29 | 95.00 | 94.00 | 94.00 |
| student 4 | 9.05 | 100.00 | 93.00 | 91.00 | 94.00 | 94.00 | 9.39 | 94.86 | 93.00 | 94.00 | 9.33 | 93.00 | 91.00 | 94.00 | 94.00 |
| student 5 | 9.05 | 100.00 | 93.00 | 91.00 | 94.00 | 94.00 | 9.39 | 94.86 | 93.00 | 94.00 | 9.33 | 93.00 | 91.00 | 94.00 | 94.00 |
| student 6 | 9.02 | 99.09 | 93.00 | 91.00 | 94.00 | 94.00 | 9.39 | 94.86 | 93.00 | 94.00 | 9.33 | 93.00 | 91.00 | 94.00 | 94.00 |
| student 7 | 9.31 | 100.00 | 96.50 | 96.00 | 98.00 | 98.00 | 9.69 | 96.00 | 96.50 | 98.00 | 9.72 | 96.50 | 96.00 | 98.00 | 98.00 |
| student 8 | 9.31 | 100.00 | 96.50 | 96.00 | 98.00 | 98.00 | 9.69 | 96.00 | 96.50 | 98.00 | 9.72 | 96.50 | 96.00 | 98.00 | 98.00 |
| student 9 | 9.31 | 100.00 | 96.50 | 96.00 | 98.00 | 98.00 | 9.69 | 96.00 | 96.50 | 98.00 | 9.72 | 96.50 | 96.00 | 98.00 | 98.00 |
| student 10 | 9.00 | 100.00 | 92.00 | 89.00 | 94.00 | 94.00 | 9.33 | 95.86 | 92.00 | 92.50 | 9.27 | 92.00 | 89.00 | 94.00 | 94.00 |
| student 11 | 8.97 | 99.09 | 92.00 | 89.00 | 94.00 | 94.00 | 9.33 | 95.86 | 92.00 | 92.50 | 9.27 | 92.00 | 89.00 | 94.00 | 94.00 |
| student 12 | 8.18 | 72.73 | 92.00 | 89.00 | 94.00 | 94.00 | 9.33 | 95.86 | 92.00 | 92.50 | 9.27 | 92.00 | 89.00 | 94.00 | 94.00 |
| student 13 | 9.00 | 100.00 | 93.00 | 91.00 | 92.50 | 92.50 | 9.50 | 96.00 | 93.00 | 96.00 | 9.26 | 93.00 | 91.00 | 92.50 | 92.50 |
| student 14 | 9.00 | 100.00 | 93.00 | 91.00 | 92.50 | 92.50 | 9.50 | 96.00 | 93.00 | 96.00 | 9.26 | 93.00 | 91.00 | 92.50 | 92.50 |
| student 15 | 9.00 | 100.00 | 93.00 | 91.00 | 92.50 | 92.50 | 9.50 | 96.00 | 93.00 | 96.00 | 9.26 | 93.00 | 91.00 | 92.50 | 92.50 |
| student 16 | 8.68 | 100.00 | 88.14 | 89.00 | 80.00 | 92.00 | 8.95 | 88.14 | 88.14 | 92.00 | 8.54 | 88.14 | 89.00 | 80.00 | 92.00 |
| student 17 | 8.86 | 100.00 | 88.14 | 89.00 | 92.00 | 92.00 | 8.95 | 88.14 | 88.14 | 92.00 | 9.02 | 88.14 | 89.00 | 92.00 | 92.00 |
| student 18 | 8.86 | 100.00 | 88.14 | 89.00 | 92.00 | 92.00 | 8.95 | 88.14 | 88.14 | 92.00 | 9.02 | 88.14 | 89.00 | 92.00 | 92.00 |
| student 19 | 9.20 | 99.09 | 96.00 | 95.00 | 96.00 | 96.00 | 9.60 | 96.00 | 96.00 | 96.00 | 9.59 | 96.00 | 95.00 | 96.00 | 96.00 |
| student 20 | 9.23 | 100.00 | 96.00 | 95.00 | 96.00 | 96.00 | 9.60 | 96.00 | 96.00 | 96.00 | 9.59 | 96.00 | 95.00 | 96.00 | 96.00 |
| student 21 | 9.07 | 100.00 | 94.00 | 93.00 | 93.00 | 93.00 | 9.01 | 82.86 | 94.00 | 92.50 | 9.34 | 94.00 | 93.00 | 93.00 | 93.00 |
| student 22 | 9.07 | 100.00 | 94.00 | 93.00 | 93.00 | 93.00 | 9.41 | 96.00 | 94.00 | 92.50 | 9.34 | 94.00 | 93.00 | 93.00 | 93.00 |
| | | | | | | | | | | | | | | | |
| Average | 8.98 | | | | | | Average 9.41 | | | | Average 9.35 | | | | |
| St. Dev. | 0.31 | | | | | | St. Dev. 0.24 | | | | St. Dev. 0.27 | | | | |

**Figure 1. Key metrics for I541 learning outcomes, broken down across by course assignments and deliverables.**

6.  **What improvements have been made based on assessment findings?**

    In preparing the next edition of the class, more guidance will be given to students to help them achieved better results in midterm project presentations (some of them never delivered professional presentations) and articulate insightful discussion points based on the theory and HCI principles studied in the readings.

**Assessment Project Two: Review of course I543 (Usability and Evaluative Methods), Fall 2010 Edition**

1. **What general outcome are you seeking?**

The course objectives of this course will include each graduate student acquiring the following:

(a) Related to obtaining *knowledge about usability and usability evaluation*, each student will acquire knowledge and the ability to explain terms and concepts related to the following range of usability topics:

- usability theory, terms, and the applied techniques
- recall of design guidelines and principles
- concepts, process and techniques for analytical (inspection) methods
- traditional usability testing methods, process and technical equipment
- analyzing usability data (qualitative and quantitative)
- reporting and communicating usability findings
- using usability results to inform redesign

(b) Related to *applying usability theory and methods* to the evaluation of actual interactive systems and products, students will:

- be able to plan and perform a systematic, comprehensive and accurate usability evaluation of a complex interactive application (desktop, web, or mobile)
- select the appropriate usability evaluation approach
- tune and adapt the general evaluation theory and approaches to the specific requirements of the system under evaluation
- critically apply, select and improve on existing usability practice

(c ) Related to *Communication* skills:

- Being able to communicate and explain effectively (aurally, visually and in written form) the key approach, methods and findings of the usability evaluation they have conducted on a non-trivial interactive system.

(a) **How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

Students will demonstrate that the planned learning objective in (1) will be achieved if the following criteria are met:

- Above 85% grade point obtained on written discussion points revealing insights and critical reflection on the usability theory studies on the course readings
- Above 80% grade point obtained on midterm and final project report
- Above 90% grade point obtained on midterm and final project class presentation

**(b) What opportunities do students have to learn it?**

Students will have the following opportunities to demonstrate to have achieved the expected learning outcomes:

1. Weekly Discussion Points, Class discussion and Class Participation (individual)
2. Weekly contribution to group project (individual)
3. Midterm Team Presentation
   3a. Midterm Project Presentation (individual contribution)
   3b. Midterm Project Presentation (group)
4. Final Team Presentation
4a. Final Project Presentation (individual contribution)
4b. Final Project Presentation (group)
5. Team Midterm Project Report
6. Team Final Project Report

**4. How are you measuring each of the desired behaviors listed in #1?**

The three pillars of learning outcomes identified in (1) measured by specific student's performances based on the course assignments, outlined in (3), and structured as follows:

*Knowledge and Understanding Competences* are measured by the weighted grades from:

- Written Discussion Points (30%)
- Midterm Project Presentation [individual] (20%)
- Midterm Project Presentation [individual] (15%)
- Final Project Presentation [individual] (20%)
- Final Project Presentation [individual] (15%)

*Application of Knowledge* is measured by the weighted grades from:

- Weekly project contribution (30%)
- Midterm Project Report (35%)
- Final Project Report (35%)

*Communication Competences* are measured by the weighted grades from:

- Midterm Project Presentation [individual] (40%)
- Midterm Project Presentation [individual] (10%)
- Final Project Presentation [individual] (40%)
- Final Project Presentation [individual] (10%)

## 7. What are the assessment findings?

The findings indicate that I543 students (N=10) have achieved a high standard of learning performance in all three pillars evaluated: knowledge & understanding (average of 8.69 out of 10), application of knowledge (8.91 out of 10) and communication competences (9.28 out of 10), with very low variation from the average (see Figure 1).

| Student Name | Knowledge & Understanding Competences (1-10) 100% | Written Discussion Points on Readings & Class participation 30% | Midterm Project Presentation (individual contribution) 20% | Midterm Project Presentation (group) 15% | Final Project Presentation (individual contribution) 20% | Final Presentation (group) 15% | Application of Knowledge Competences (1-10) 100% | Weekly project contribution 30% | Midterm Project Report 35% | Final Project Report 35% | Communication Competences (1-10) 100% | Midterm Project Presentation (individual contribution) 40% | Midterm Project Presentation (group) 10% | Final Project Presentation (individual contribution) 40% | Final Presentation (group) 10% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| student 1 | 8.46 | 75.00 | 96.00 | 96.00 | 95.00 | 95.00 | 9.12 | 83.33 | 96.00 | 93.00 | 9.55 | 96.00 | 96.00 | 95.00 | 95.00 |
| student 2 | 9.17 | 100.00 | 94.00 | 94.00 | 96.00 | 96.00 | 9.59 | 96.67 | 95.00 | 96.00 | 9.50 | 94.00 | 94.00 | 96.00 | 96.00 |
| student 3 | 9.15 | 99.17 | 94.00 | 94.00 | 96.00 | 96.00 | 9.59 | 96.67 | 95.00 | 96.00 | 9.50 | 94.00 | 94.00 | 96.00 | 96.00 |
| student 4 | 9.17 | 100.00 | 94.00 | 94.00 | 96.00 | 96.00 | 9.59 | 96.67 | 95.00 | 96.00 | 9.50 | 94.00 | 94.00 | 96.00 | 96.00 |
| student 5 | 8.14 | 71.67 | 94.00 | 90.00 | 92.00 | 92.00 | 8.67 | 82.50 | 87.00 | 90.00 | 9.26 | 94.00 | 90.00 | 92.00 | 92.00 |
| student 6 | 6.69 | 39.17 | 70.00 | 90.00 | 92.00 | 92.00 | 5.02 | 65.83 | 87.00 | 0.00 | 8.30 | 70.00 | 90.00 | 92.00 | 92.00 |
| student 7 | 8.99 | 100.00 | 94.00 | 90.00 | 92.00 | 92.00 | 9.20 | 100.00 | 87.00 | 90.00 | 9.26 | 94.00 | 90.00 | 92.00 | 92.00 |
| student 8 | 9.05 | 100.00 | 93.00 | 93.00 | 93.00 | 93.00 | 9.46 | 98.33 | 93.00 | 93.00 | 9.30 | 93.00 | 93.00 | 93.00 | 93.00 |
| student 9 | 9.05 | 100.00 | 93.00 | 93.00 | 93.00 | 93.00 | 9.46 | 98.33 | 93.00 | 93.00 | 9.30 | 93.00 | 93.00 | 93.00 | 93.00 |
| student 10 | 9.02 | 99.17 | 93.00 | 93.00 | 93.00 | 93.00 | 9.46 | 98.33 | 93.00 | 93.00 | 9.30 | 93.00 | 93.00 | 93.00 | 93.00 |
| | | | | | | | | | | | | | | | |
| Average | 8.69 | | | | Average | | 8.91 | | | Average | 9.28 | | | | |
| Standard Deviation | 0.78 | | | | Standard Deviation | | 1.40 | | Standard Deviation | | 0.36 | | | | |

Figure 2. Key metrics for I543 learning outcomes, broken down across by course assignments and deliverables.

## 8. What improvements have been made based on assessment findings?

In preparing the next edition of the class, more systematic and detailed guidance will be given to help them apply the usability knowledge gained in the theoretical readings and case studies to the specific characteristics and requirements of the chosen HCI system to evaluate.

| SoI – Health Informatics MS Program | | | | | |
|---|---|---|---|---|---|
| | Degrees Awarded | Certificates Awarded | Percent Employed | Average Salary | Ph.D. Acceptances |
| 2008-2009 | 10 | 0 | 86% | 39 – 45K | -- |
| 2009-2010 | 9 | 0 | 83% | 70,000 | -- |
| 2010-2011 | 19 | 0 | 86% | 60,000 | 14% |

**PLANNING FOR LEARNING AND ASSESSMENT**
**INFO530 – Foundation of Health Informatics:** Online course for freshman Masters and PhD Health Informatics students.
This course introduces the foundation of Health Informatics. It reviews how information sciences and computer technology can be applied to enhance research and practice in healthcare. The basic principles of informatics that govern communication systems, clinical decisions, information retrieval, telemedicine, bioinformatics and evidence based medicine are explored. Please refer to http://info530.com/core/public_page.php?page_name=syllabus for the syllabus of the course. More information: www.info530.com

**I. Knowledge and Understanding Competencies (35%)**

**a) How would you know it (the outcome) if you saw it?  (What will the student know or be able to do?)**
1. **Recall Terminologies, Concepts and Relationships**:  Students should be able to remember, recall and discuss the terminologies and concepts specific to the course topics. Students should also be able to understand the relationship among the acquired concepts. For example, a student recalls that a certain health informatics solution is designed for a specific requirement.
2. **Locate Knowledge Components**: Students should be able to discuss and explain the relationship among different components of the weekly topics. This will ensure that students learn how the new topic fits in the larger structure of the health informatics science. For example, a student becomes able to categorize various health informatics coding and classification standards.
3. **Infer Theoretical Deduction**: Students shall explain the integration of the acquired knowledge, and express how they can utilize their new knowledge in health informatics. For example, a student explains (or answers a question about) how the technical architecture of the web is inherited in health informatics applications.

**b) What opportunities do students have to learn it? (in class or out of class)**

1. **Prerecorded Slides:** The course utilizes an online format. Prerecorded slides are prepared weekly and posted online for each topic. Prerecorded slides include the instructor's voice-over explaining each slide in details. Slides are available in different formats (e.g., iPhone) to facilitate accessing the slides by part-time students.

2. **Reading Material:** Each week, two types of reading materials are provided to the students: Critical and Optional. Students are asked to study the critical readings; however, studying other resources is optional. Optional readings are designed specifically to help students that lack certain scientific backgrounds. Reading materials often contain chapters of textbooks, recently published articles, and web resources. Acrobat PDF files of various resources are available online to students. Certain paragraphs of these files are already highlighted by the instructor for students to ease locating the most important sections.

**c) How are you measuring each of the desired behaviors listed in (b.)?**

1. **Online Quizzes (50%):** Multiple choice questions (MCQ) are offered in the form of online quizzes on a weekly basis. Each quiz includes various questions. Some questions often focus on factual information. Other questions require inductive and deductive processes of students to find the proper answer. Quizzes are timed but they are open book, open web and open slide. The open nature of the quiz allows for further enhancement of the students' learning outcome.

   After each deadline, the answers to all questions are posted online and additional comments become available for each question. This empowers the effect of the quizzes in increasing the knowledge uptake of students. Please refer to 'OnCourse > INFO530 > Original Test and Survey > Quiz #1 to #15' for further information.

2. **Assignments (30%):** Bi-weekly assignments are administered in this course. Often the assignments include questions that evaluate the recall rate of students about factual information learned in each session.

3. **Course Paper (20%):** Students are required to conduct a literature review (or systematic review if participating in a group) on either their topic of interest or a predefined topic. The literature review involves reviewing multiple publications, and thus assists students in learning new topics.

   The course paper includes a section titled 'Findings'. This section summarizes their review and reflects the knowledge they have acquired by reviewing the publications.

**d) What are the assessment findings?**
*The following findings are based on previous years in which the same syllabus was used.*

1. **Quizzes:** The average score of the previous quizzes is 89 out of 100. This relatively high score indicates the effort that students have had in carefully studying the material (i.e., prerecorded slides and reading materials). A low standardized score in quizzes indicates the low efficiency of the prerecorded slides and/or assigned material. Thus, the slides and reading material should have been revised. In this course, however, the average score has been relatively high in past years.

2. **Assignments:** The average score of factual questions in previous assignments is almost 92 out of 100. It should be mentioned that this estimation includes a margin of error due to the lack of clear criteria to identify fact-only questions among previous assignments. Lower marks in fact-recall questions compared to other types of questions in assignments reveal the lack of careful studying of the slides and reading materials on the part of students. In this course, however, this mark has been high in the previous years.

3. **Course Paper:** Based on the results from previous semesters, often students have accumulated more points in the background review section of their papers compared to other sections. Numerical data are not available for this argument due to the special format of the rubric used in previous years.

**e) What improvements have been made based on assessment findings?**

1. **Low Score Scenario**: A consistent low average score of students across aforementioned measuring tools (e.g., quizzes) indicates a possible problem in the format and/or content of the knowledge represented in the course. If this occurs, a change in the format or content of the reading material, prerecorded slides, topic selection, and/or measuring approach should be applied.
2. **High Score Scenario:** An unusually very high score may indicate a problem in the measuring technique and/or knowledge representation. A revision of the measuring techniques (e.g., increasing the difficulty) or knowledge representation (e.g., increasing the quality or quantity of the material) will become necessary if this occurs.
3. **Current Course Status**: Currently, the aggregated assessment findings in this course represent a normally distributed score and thus are not indicative of a need for an immediate change. In order to accommodate the need to learn the up-to-date health informatics knowledge, however, revisions are made each year to the content of the prerecorded slides and reading material. Indeed, almost 30% of the prerecorded slides and reading material are updated each year. Assessment tools are also updated to reflect the changes in the study material.
4. **Aggregated Findings**: The aggregated assessment findings across health information courses should fulfill the minimum requirements of the intended degree. For example, if a Master student is required to comprehend a list of items as part of his/her degree requirements, we should make sure that those items are well covered across the health informatics curriculum.

**II. Application of Knowledge Competencies (25%)**

**a) How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

1. **Critical Thinking:** Students should be able to critically analyze the available information (often acquired through the knowledge acquisition process and propose new ideas based on inductive or deductive processes). For example, a student concludes that a technical architecture cannot be used in a healthcare setting due to the lack of certain specifications.
2. **Practical Thinking:** Students should be able to apply their knowledge to the real-world settings. To make health informatics solutions practical, the student should be able to study the required goals, possible settings, and potential users, and then customize the solution.
3. **Creativity:** Although health informatics is usually not considered a creative field, students can be quite creative in proposing new solutions. For example, the application of wireless devices in various healthcare settings requires not only practical thinking, but also creativity.
4. **Original Research:** Students should be able to propose ideas that can lead into original research and possibly scientific publications. This requires having a general view of the field, being able to critically analyze the current research, and finally propose new research ideas.

**b) How will you help students learn it? (in class or out of class)**

1. **Prerecorded Slides:** As mentioned before (see last row), the course utilizes an online format. Prerecorded slides are prepared weekly and posted online. Due to the asynchronous nature of this online course, direct discussions between the instructor and students do not exist. The slides, however, apply a step-by-step process with made-up questions to substitute for the lack of face-to-face interaction. The instructor often uses a problem-based approach in teaching the material in order to induce critical thinking in students. For example, a problem is introduced and then the knowledge is presented in an approach to solve the problem. Sometimes, the instructor uses a question at the end of the slides to further discuss the application and integration of the topic in other settings.
2. **Reading Material:** The reading material is selected from various sources. For example, five textbooks are used in this course. Chapters, articles and web sources are carefully selected in order to build-up an appropriate level of critical thinking competency in students as they progress in the course. For example, a chapter of a textbook may concentrate on factual information, while a related publication depicts how that information is integrated and applied to a special setting.
3. **Discussion Forum:** The course is offered online and hence no face-to-face interaction exists. Nevertheless, an online discussion forum is being utilized to compensate for the lack of live interaction. Each week the instructor proposes a problem to be discussed in the discussion forum.

**c) How could you measure each of the desired behaviors listed before? (b)**

1. **Course Paper (50%):** As discussed before, students are required to conduct a literature review on a selected topic.

Organizing the reviewed literatures systematically enhances the students' ability to acquire a high level view of the existing literature, and consequently see how they are applied and integrated in various research topics. The literature review also includes sections that directly reflect the amount of critical thinking used to criticize the literature. For example, in the discussion section of the course paper, students are asked to explain what is lacking in the reviewed literature. Future work, a section of the course paper, reveals the creativity of the students in proposing novel ideas for new research opportunities. In summary, students should apply inductive skills to find what is missing in current research, and then use their deductive skills to propose new solutions.

2. **Assignments (30%):** Assignments include questions that evaluate the critical thinking skills of students in regards to the knowledge they have learned each session. For example, students are asked how to apply a generic informatics solution in a healthcare setting.
3. **Discussion Forum (10%):** Questions posted on the discussion forum shows how critically students look at the topics. Due to the interactivity of discussion forums, students learn both how to read and how to argue critically. The amount of students' activity in the forum, the quality of the postings, and their power to criticize others are all indicators to assess critical/practical thinking competencies.
4. **Online Quizzes (10%):** Sometimes quizzes include questions that require inductive and deductive thinking of students to find the proper answer.

**d) What are the assessment findings? (c)**

*The following findings are based on previous years in which the same syllabus was used.*

1. **Course Paper (50%):** As discussed before, students are required to conduct a literature review on a selected topic.

Organizing the reviewed literatures systematically enhances the students' ability to acquire a high level view of the existing literature, and consequently see how they are applied and integrated in various research topics. The literature review also includes sections that directly reflect the amount of critical thinking used to criticize the literature. For example, in the discussion section of the course paper, students are asked to explain what is lacking in the reviewed literature. Future work, a section of the course paper, reveals the creativity of the students in proposing novel ideas for new research opportunities.  In summary, students should apply inductive skills to find what is missing in current research, and then use their deductive skills to propose new solutions.

2. **Assignments (30%):** Assignments include questions that evaluate the critical thinking skills of students in regards to the knowledge they have learned each session. For example, students are asked how to apply a generic informatics solution in a healthcare setting.

3. **Discussion Forum (10%):** Questions posted on the discussion forum shows how critically students look at the topics. Due to the interactivity of discussion forums, students learn both how to read and how to argue critically.  The amount of students' activity in the forum, the quality of the postings, and their power to criticize others are all indicators to assess critical/practical thinking competencies.
4. **Online Quizzes (10%):** Sometimes quizzes include questions that require inductive and deductive thinking of students to find the proper answer.

**E. How will the aggregated assessment findings be used to improve your program?**

1. **Low Score Scenario:** A consistent low average score of students across aforementioned measuring tools (e.g., course paper) indicates a possible lack of a proper strategy to teach students how knowledge should be applied across different topics. If this occurs, a change in the format or content of the reading material, prerecorded slides, discussion forum topics, and/or measurement approaches should be applied.
2. **High Score Scenario:** An unusually very high score may indicate a problem in the measuring technique. A revision of the measuring techniques (e.g., increasing the difficulty) becomes necessary if this occurs.
3. **Course Current Status:** Currently, the aggregated assessment findings in this course represent a normally distributed score and thus do not indicate a need for a change. This year, for the first time relevant information about critical thinking is explicitly provided on the course website. In addition, detailed information about reviewing the literature systematically is also given to students. Necessary updates will be applied to these resources as needed.
4. **Aggregated Findings:** The aggregated assessment findings across health informatics courses should fulfill the minimum requirements of the intended degree. For example, if a PhD student is required to acquire critical thinking competencies on a list of subjects as part of their qualification requirements, we should make sure that those items are covered across the health informatics curriculum. As an instance, this course stresses less on critical thinking than knowledge acquisition due to the fact that it is a foundational level course, while another course (i.e., info535) focuses heavily on real world projects to compensate for this fact.

**III. Communication Competencies (10%)**

**a)  How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

*Due to the asynchronous online format of this course, presentation or verbal skills are not measured.*

1. **Organizing Thoughts:** Students should be able to convey thoughts in a focused and concrete manner. For example, a student should be able to summarize a series of reviewed papers into an organized table of summary.
2. **Writing Competencies:** Students should be able to write effectively. The competency includes: arrangement of topics, scientific writing, citation styles, and referencing.
3. **Group Communications:** Students should be able to communicate efficiently and effectively with their group members (if they decide to do a systematic review for their course paper). They should be able to clearly express their view, convey their message, argue various options, and respond effectively to their group members.

**b) How will you help students learn it? (in class or out of class)**

1. **Course Paper Template:** As discussed before, students are required to conduct a literature or a systematic review. A template for this review is provided to students. Detailed information about each section of the template and how to organize the content is discussed in a separate document. The template and the explanations about the template provide a starting point to learn how to write scientifically. For example, it is discussed what information the methodology of a literature review entails and why.
2. **Scientific Citation:** APA (American Psychological Association) referencing style is discussed in separate documents. Additional resource and links are also provided to students.
3. **Grading Comments:** Assignments and final papers are graded along with specific comments made by the instructor for each question or section. These comments are added as an internal feature of the MS Word program. Some of the comments directly target writing and organizational skills. For example, grammar issues, citation problems, or summarization techniques are discussed in the comments.
4. **Discussion Forum:** Online discussions provide an opportunity to students to learn from each other how to write their arguments. The instructor has a passive role in this approach.
5. **Group Work:** Students have the option to opt-in a systematic review as their course paper in which group work is required. This will enable them to enhance their inter-group communication skills.

**c) How could you measure each of the desired behaviors listed before? (b)**

1. **Course Paper (80%):** As discussed before, students are required to conduct a literature review on a selected topic. A considerable amount of the course-paper involves communication competencies. General structure of the paper, spelling and grammar issues, organization of the findings, proper APA citation and referencing are included in the assessment rubric of the paper. Proper feedback, in the form of comments, is directly provided to each student.

2. **Assignments (10%):** Spelling and grammar issues, proper citations, and APA referencing are also included in the assessment of the assignments. Feedback is provided to students by comments made on questions that were answered incorrectly.
3. **Group Communications and Discussion Forum (10%):** Communication competencies will be assessed in both group communications (e.g., emails) and the online discussion forum. Direct feedback is not provided in this form of assessment.

**d) What are the assessment findings? (c)**

*The following findings are based on previous years in which the same syllabus was used.*

1. **Course Paper:** In previous years, most of the students have lost considerable points (almost 6 out of 100) for improper citations or referencing. This year, additional information on proper citation styles (i.e., APA) is provided to the students. Extra information about referencing tools is also available on the course website. Students are reminded that improper citation may lead into unintended plagiarism. The course-paper template has enormously helped the students to organize their material in a scientific format. The same template, with slight improvements, is offered this year.

**e) How will the aggregated assessment findings be used to improve your program?**

1. **Low Score Scenario:** A consistent low score of students across aforementioned measuring tools (e.g., course paper) indicates a need for more knowledge transfer of communication skills (e.g., scientific writing). If a low score occurs, more information about scientific writing should be included in the course syllabus. Another approach may be the adoption of a writing-course as a prerequisite to the course.
2. **High Score Scenario:** A high score scenario is not conclusive.
3. **Course Current Status:** Currently, the moderately low-scored assessment findings, specifically in regards to proper citation styles, represent a need for teaching strategies to enhance communication competencies. Appropriate measures are already taken to meet these challenges.
4. **Aggregated Findings:** Communication skills are often ignored in academia with the assumption that students will learn these competencies automatically. The health informatics curriculum needs to ensure that some of these skills are at least included in various courses, if not assessed. Depending on the course, various communication skills can be targeted. For example, citation and reference writing skills are required for this course, while presentation skills are often part of the seminar courses.

IV. **Learning Autonomy Competencies (20%)**

**a)** How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)

1. **Information Retrieval:** Students should be able to find answers to the questions that are not covered directly in the course. This requires the ability to search and locate new information without the help of others. For example a student is asked to find information about personal health records. The student uses certain keywords on a series of databases to find the relevant information.

2. **New Integration and Application:** The student should be able to relate the self-acquired information to what they already know; and build upon the new information a new foundation of knowledge that could be further integrated and applied in other areas. For example the student identifies the newly acquired information as consumer health informatics and then integrates and applies the new knowledge into real-world problems such as the use of personal health records in diabetes.

2. **Literature Review and Knowledge Compartmentalization**: This requires the ability to find and review a series of scientific publications that are related to a certain topic. Students should be able to categorize the new findings based on a systematic approach to create new components of knowledge. For example, a student reviews the literature about personal health records and categorizes them into tethered and non-tethered systems. While reading new publications, the student tries to assign them into one of the developed categories.

**b)** How will you help students learn it? (in class or out of class)

1. **Reading Material:** Each week a series of reading material is provided to the students. Sometimes the reading material is not directly covered in the prerecorded slides. This empowers a self-learning process in which students are required to comprehend material on their own. The material is mainly used for assignments but sometimes the quizzes as well. For example, for the 'Medical Data and Decision-Making' session, one of the readings covers several mathematical foundations of decision systems such as 'Fuzzy systems' that are not covered in the prerecorded slides. Appropriate optional reading and web resources, however, are provided to support the self-learning experience of the students.

2. **Information Seeking Methods:** Students are provided with several documents explaining the details of a literature (and systematic) review. These documents explain the steps involved in keyword selection process, database search strategies, inclusion-exclusion criteria, consensus based confirmation, publication quality measure, and systematic categorization.

**c)** How could you measure each of the desired behaviors listed before? (b)

1. **Course Paper (50%):** As discussed before, students are required to conduct a literature- or systematic- review on a topic.

Students are required to perform (and consequently train) a series of steps to locate their target publications. Information retrieval, integration of the new information into past knowledge, application of the new information into new contexts, and finally systematic organization of knowledge are all required tasks to accomplish the review.

2. **Assignments (40%):** Often assignments include questions that are not directly covered in the course. Thus, students are obliged to search for the new information and try to integrate it with their current knowledge.

   Proper feedback is directly provided to each student (as comments) to enhance the self-learning outcome. For example, if the answer of such a question is incorrect, an excerpt of a textbook and further links will be provided to the student.

3. **Online Quizzes (10%):** Rarely quizzes contain questions that are from uncovered material in the prerecorded slides. Students have enough time (usually 3 to 4 minutes) to find the proper answer by accessing the web or quickly scanning the uncovered material.

d) **What are the assessment findings? (c)**

*The following findings are based on previous years in which the same syllabus was used.*

1. **Course Paper:** In previous years, most of the students have been successful in learning, collecting and analyzing new information on their own. This fact might be attributed to the maturity of health informatics students (i.e., they often have multiple years of working experience). Junior students who entered the program directly from a bachelor degree, however, sometimes have had a hard time locating the resources. Cross-discipline searches have been often challenging for students. For example, a student with a computer science background may find it hard to search for medical literature or study them on his/her own. Data were not collected for this measure and thus statistics are unavailable. This year, additional information on proper search strategies is offered online. Students are advised to embark on literature reviews that are not too distant to their background. Additional cross-discipline information (mainly adopted from health informatics prerequisite courses) is provided to the students in case they want to work on a paper that is not based on their background.

2. **Assignments:** The average score of self-learning-required questions of assignments in previous classes is around 79 out of 100. It should be mentioned that this estimation includes a margin of error due to the lack of clear criteria to identify self-learning questions. Lower marks in this type of questions compared to other types of questions (e.g., fact recall questions) reveals the importance of providing additional (and sometimes motivational) self-learning guides to students. In this course, additional tips are provided to students to motivate then to find the relevant information for each assignment.

3. **Quizzes:** Clear-cut data is not available. No conclusion can be made based on previous year data.

**e) How will the aggregated assessment findings be used to improve your program?**

1. **Low Score Scenario:** A consistent low average score of students across aforementioned measuring tools (e.g., course paper or assignments) indicates a need for additional information about the importance of self-learning in long term. If a low score occurs, more information about self-learning strategies should be included in the course syllabus.
2. **High Score Scenario:** An unusually very high score may indicate a problem in the measuring technique and/or self-learning expectations. A revision of the measuring techniques (e.g., increasing the difficulty) will become necessary if this occurs.
3. **Course Current Status:** Currently, the moderate scored assessment findings, specifically in regards to self-learning focused questions, represent a need for further teaching strategies to enhance learning autonomy competencies. Appropriate solutions such as self-learning approaches are already included this year in the course to overcome these challenges.
4. **Aggregated Findings:** Self-learning is vital in health informatics. Both health and informatics sciences are constantly changing and students should be able to learn and updated themselves after they graduate. The health informatics program should include activities or projects in its curriculum to ask for such tasks. This course trains students how to search for information and conduct a proper literature review, however, this course does not involve in the application of the newly acquired knowledge into real-world settings. Other courses should train students to apply the newly self-learned information in practical situations.

V. **Judgment Competencies (10%)**

**a) How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

1. **Scholarly Judgment:** The students should be able to review and judge scholarly publications. This competency is vital in accomplishing peer-reviews in academia. For example, in the literature review students should be able to critically analyze and rank the articles by a logical approach.
2. **Human Ethics:** Frequently health informatics deals with sensitive data. The students should be able to understand these issues and consider them in their future work. For example, students should know the basics of privacy and security issue involved in health information exchange.

**b) How will you help students learn it? (in class or out of class)**

1. **Prerecorded Slides:** Privacy (e.g., HIPPA regulations), security issues (e.g., web security), and ethical issues (e.g., research involving human participants) in health informatics are covered in various prerecorded sessions.
2. **Discussion Forum:** Often controversial topics are posted online. The arguments and counter-arguments will help developing judgmental competencies in students.
3. **Literature Quality Ranking:** Students are required to judge the quality of the reviewed literature before including them into the final review paper. For example, they cross tabulate a list of literature against a set of quality criteria. After scoring each literature, they rank them based on their quality scores.

c) **How could you measure each of the desired behaviors listed before? (b)**

1. **Course Paper (90%):** Students are required to conduct a literature review (or systematic review if participating in a group). The literature review involves reviewing multiple sources of information (e.g., publications). The students are required to rank these sources. Proper ranking is measured as part of the final grade.
2. **Discussion Forum (10%):** Although there are ample opportunities to measure the judgmental skills of students in the online discussion forum, due to the lack of a consistent and effective quantitative rubric to measure such skills, the share of this measurement tool is considerably lower compared to literature quality ranking measure explained above.

d) **What are the assessment findings? (c)**

*The following findings are based on previous years in which the same syllabus was used.*

1. **Course Paper:** In previous years, quality measure was not part of the literature review requirements. Thus, findings are not available.
2. **Discussion Forum:** Data were collected by qualitative measures. Quantitative measures are missing. Available data from previous years are not conclusive.

e) **How will the aggregated assessment findings be used to improve your program?**

1. **Low Score Scenario:** A consistent low score across aforementioned measuring tools (mainly the course paper) indicates a possible problem in the methodology of ranking the literature. If this occurs, the ranking criteria should be adjusted and explained in detail to students.
2. **High Score Scenario:** A high score scenario is not applicable.
3. **Course Current Status:** Currently, the course requires additional steps to identify high quality publications for the course paper.

Additional prerecorded slides covering security and privacy issues are also added.

4. **Aggregated Findings:** Judgment competency is vital in healthcare, and consequently in healthcare information. This course covers basic information about security, privacy and confidentiality of healthcare data; however, more in-depth discussion on research methods, ethical considerations, and institutional review board (IRB) applications should be included in courses (e.g., info535) that involve a real-world project.

*(a) The share of each competency in the total competency target level of this course is shown in percentage. The total of shares (first column) sums up to 100%.*
*(b) The effect of each measurement tool in assessing a certain competency is shown in percentage. The total of tools in each competency (row) sums up to 100%*
*(c) Findings are based on the courses offered in the previous years in which the same syllabus was used.*

**PLANNING FOR LEARNING AND ASSESSMENT**

**INFO I535_NURS I631 – Clinical Information Systems:** Online core course for Masters and PhD Health Informatics students, core course for Doctor of Nursing Practice (DNP) and Nursing Informatics certificate.

This course provides an introduction to clinical information systems. Clinical information systems include: human computer interface and systems design; healthcare decision support and clinical guidelines; system selection; organizational issues in system integration; project management for information technology change; system evaluation; regulatory policies; impact of the Internet; economic impacts of e-health; distributed healthcare information technologies and future trends.

**I. Knowledge and Understanding Competencies (25%)**

**a) How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

1. **Recall Concepts and Relationships:**  Students should be able to remember, recall and discuss the terminologies and concepts specific to the course topics. Students should also be able to understand the relationship among the acquired concepts
2. **Locate Knowledge Components:** Students should be able to critically discuss and explain the relationship among the required readings and weekly discussion topic. This will ensure that students learn how the structure and connectivity of health informatics applications.

3. **Infer Theoretical Deduction:** Students shall explain the integration of the acquired knowledge, and express how they can utilize their new knowledge in health informatics. For example, a student explains (or answers a question about) how clinical information systems architecture is inherited in health informatics applications.

**b) How will you help students learn it? (in class or out of class)**

1. **Online lecture structure: The course utilizes an online format.  Each week the instructor will publish the following:**
   a. **Required Learning Activities:**
      - list textbook readings and assigned articles related to the discussion topics.
      - Several articles will be posted since students are all coming from different backgrounds.
      - The article(s) that are required for all participants are marked with a star. (*). Additional independent readings are recommended.
   b. **Group Directed Learning Activities:**
      - a problem will be introduced by the instructor. The assigned and independent readings as well as the mini lecture will be helpful in structuring the online discussion.
        The discussion is prepared by the student by identifying the problem components, define the relevant relationship between the components, describe the problem boundaries (i.e. How many ways can we think about the problem), and generate potential solutions to the problem.
      - Each class member posts his or her view in the designated discussion room by Wednesday midnight unless otherwise specified.
      - By Friday midnight (unless otherwise specified), each class member  read  their peers posting and critically appraise it for:
      - major groupings of facts and/or knowledge
      - the interconnection between the facts and knowledge (mind map)

      **Note:** *the faculty will observe the ongoing discussion but not intervene unless the discussion needs to be redirected.  A reflection of the faculty on the discussion will be provided after all postings are completed.*
   c. **Mini Lecture:**
        The instructor introduces the weekly topic. Terminology and concepts needed to understand the topic are clarified.

**c) How could you measure each of the desired behaviors listed before? (b)**

1.  **Online Discussions (35%):**

Student is scored on a scale of 1-4 on each of the following attributes.

a.  **References:** the degree to which required readings are included and the way references are used in the student's postings
b.  **Level of cognition:** the degree to which the student's postings represent basic knowledge recall, comprehension, application or higher levels of cognition such as analysis, evaluation or synthesis from the readings/discussion.
c.  **Answer development and logic:** the degree to which the student's postings logically address and develop the questions posed in the assignment.
d.  **Respect and level of peer interaction**: the degree to which the student's postings reflect respect for others and the extent to which the student extends or generates higher levels of cognition among their peers.

2. **Course Paper (20%):**
In week 9, based on previous modules and lectures, the students propose and defend evaluation methods/metric for an electronic health record system implementation:
a.  at the time of implementation
b.  six months after initial implementation
c.  one year after implementation

**d) What are the assessment findings? (c)**
The following findings are based on previous years in which the same syllabus and course organization was used.
1.  **Discussions:** The average course score of the discussion ranges from 85 to 98 percent. This relatively high score indicates the effort that students have had in carefully reviewing the assigned readings and mini-lectures.
2.  **Assignments:** The average score of written assignment is 92 percent. It should be mentioned that a student gets an opportunity to resubmit the paper when his/her initial score is below 80 percent. The grade for the assignment is the average of both grades obtained.
    The most common issue with the paper is lack of concrete measurable variables.

**e) How will the aggregated assessment findings be used to improve your program?**

1. **Low Score Scenario**: A consistent low average score of students across aforementioned measuring tools (e.g., course paper) indicates a possible lack of a proper strategy to teach students how knowledge should be applied across different topics. Additional reading material and exemplars of papers, and/or measurement approaches should be provided.
2. **High Score Scenario:** An unusually very high score may indicate an inappropriate level of course content and related assignments.
3. **Course Current Status:** Currently, the aggregated assessment findings in this course represent a normally distributed score and thus do not indicate a need for a change.
4. **Aggregated Findings:** The aggregated assessment findings across health informatics courses should fulfill the minimum requirements of the intended degree and stay abreast of the development of the domain. The health informatics curriculum should reflect the current competencies required for the science and practice of health informatics.

II. **Application of Knowledge Competencies (30%)**

**a) How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**
1. **Critical Thinking:** Students should be able to critically analyze the information presented and propose new ideas based on inductive or deductive processes in interaction with their peers during online discussions.
2. **Practical Thinking:** Students should be able **t**o apply their knowledge to the real-world settings through the online service learning projects (45% of course grade). To make health informatics solutions such as Clinical Information Systems practical, the student should be able to analyze the clinical context, and potential users, and then suggest and/or implement an appropriate clinical information system.
3. **Creativity:** Although health informatics is usually not considered a creative field, students can be quite creative in proposing novel approaches to clinical information systems such as in the written assignment and the online projects.
4. **Original Research:** Students should be able to reference their postings based on the assigned and independent readings.

**b) How will you help students learn it? (in class or out of class)**
1. **Course organization: (see above)**
   Due to the asynchronous nature of this online course, direct interaction between the instructor and students does not exist (except for online office hours). The instructor often uses a problem-based approach in teaching the material in order to induce critical thinking among students within online discussions. For example, a problem is introduced by the instructor and then the knowledge is implemented by students in solving the problem.

2. **Reading Material:** The reading material is selected from various sources to suit the different educational and professional background of students. Chapters, articles and web sources are carefully selected in order to build-up an appropriate level of critical thinking competency in students as they progress in the course.

3. **Discussion Forum:** The course is offered online and hence no face-to-face interaction exists. Nevertheless, an online discussion forum is being utilized to compensate for the lack of live interaction. Each week the instructor proposes a problem to be discussed in the discussion forum. Weekly online office hours using Adobe Connect are offered to review course content, discuss assignments, etc.

**c) How could you measure each of the desired behaviors listed before? (b)**

1. **Online Course Project (45%):** This assignment is designed to evaluate the student's ability to participate in a clinical information systems project development and implementation. The projects are real life clinical information system analysis, development, implementation, or evaluation projects in order to maximize students learning opportunities. Several prominent local and national health care institutions or enterprises are offering projects for this purpose. In addition, some of these projects have evolved in r dissertation projects and/or internships. Each project-team comprises 2 to 3 (maximum) students and requires active participation from each team member.

2. **Written Assignments (20%):** Assignment (week 9) requires the student to propose an evaluation approach for EHR demonstrating critical thinking skills in regards to the knowledge they have learned in previous modules.

3. **Discussion Forum (35%):** a problem will be introduced by the instructor. Assigned and independent readings as well as the mini lecture will be helpful in structuring the discussion. The discussion is prepared by identifying the problem components, define the relevant relationship between the components, describe the problem boundaries (i.e. How many ways can we think about the problem), and generate potential solutions to the problem. The amount of students' activity in the forum, the quality of the postings, and their power to critically evaluate their peers' postings others are all indicators of critical thinking competencies.

**d) What are the assessment findings? (c)**

*The following findings are based on previous years in which the same syllabus and course organization was used.*

1. **Course Paper:** Student should be able to critically apply the course content of the 8 previous weeks in this assignment. Students are asked to propose an evaluation matrix for an EHR at 3 different points in time. The scores range from 80 to 100. Lower scores are mostly due to providing very vague and abstract measuring matrices.

2. **Projects:** As mentioned earlier, projects are online services learning applications. Assignments. Overall the students value these projects for their practical application. On average, scores range from 70 to 98.

3. **Discussion Forum:** Despite the limits of online fora, student postings per discussion topic average five+, indicating very high levels of student engagement and exposure to new ideas.

**e) How will the aggregated assessment findings be used to improve your program?**

1. **Low Score Scenario:** A consistent low average score of students across aforementioned measuring tools (e.g., course paper) indicates a possible lack of a proper strategy to teach students how knowledge should be applied across different topics. Additional reading material and exemplars of papers, and/or measurement approaches should be provided.
2. **High Score Scenario:** An unusually very high score may indicate an inappropriate level of course content and related assignments.
3. **Course Current Status:** Currently, the aggregated assessment findings in this course represent a normally distributed score and thus do not indicate a need for a change.
4. **Aggregated Findings:** The aggregated assessment findings across health informatics courses should fulfill the minimum requirements of the intended degree and stay abreast of the development of the domain. The health informatics curriculum should reflect the current competencies required for the science and practice of health informatics.

**III. Communication Competencies (15%)**

**a) How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

*Due to the asynchronous online format of this course, presentation or verbal skills cannot be measured.*

1. **Organizing Thoughts:** Students should be able to convey thoughts in a focused and concrete manner. For example, a student should be able to critically evaluate the reading material and reflect on their peers postings.
2. **Writing Competencies:** Students should be able to write effectively. The competencies include but are not limited to: logical representation of ideas, scientific writing, appropriate citation styles, and referencing.
3. **Group Communications:** Students should be able to communicate efficiently and effectively with their peers. They should be able to clearly express their view, convey their message, argue various options, and respond effectively to their team members.

**b) How will you help students learn it? (in class or out of class)**

1. **Course Paper Template:** As discussed before, students are required to propose an evaluation matrix. Published evaluation guidelines are provided to students. In addition the students are provided with a template including the scoring scheme of the paper.
2. **Scientific Citation:** APA (American Psychological Association) referencing style is preferred.
3. **Grading Comments:** Assignments and final papers are graded along with specific comments made by the instructor as appropriate. The feedback is returned to the student. Students are given the option to revise the paper in which case the obtained scores are averaged.
4. **Discussion Forum:** Online discussions provide an opportunity for interactive learning through critical, creative thinking and reflection-in-action.
5. **Group Work:** Students participate in a project in which group work is mandatory. This will enable them to enhance their inter-group and interdisciplinary communication skills representative of the transdisciplinary nature of health informatics.

**c) How could you measure each of the desired behaviors listed before?**
1. **Online Project (45%):** As discussed before, students are required to participate in an online service learning project. Besides communicating with team members and project mentor, each team is required to report three times on the project progress to their classmates.
2. **Group Communications and Discussion Forum (35%):** Online communication competencies are assesses using the discussion rubric described earlier. Feedback on discussion participation is provided every four modules and upon request.

**d) What are the assessment findings? (c)**
*The following findings are based on previous years in which the same syllabus and course organization was used.*
1. **Course Paper:** In general, most students have lost considerable points for lack of providing concrete measuring tools and/or the lack of operationalization of variables as well as incomplete and/or inconsistent referencing.

**e) How will the aggregated assessment findings be used to improve your program?**
1. **Low Score Scenario**: A consistent low score of students across aforementioned measuring tools (e.g., course paper, discussion participation, project) indicates a need for revision of the course demands and assignments
2. **High Score Scenario**: A high score scenario is not conclusive.
3. **Course Current Status:** Currently, a weekly online office hour using Adobe Connect has been added to provide students opportunity for additional explanation and feedback.  These weekly office hours are well attended (from 3 to 17 students).
4. **Aggregated Findings:** Communication skills are often ignored in academia with the assumption that students will learn these competencies automatically.

The health informatics curriculum needs to ensure that communication skills are facilitated in various courses as they are essential in the transdisciplinary nature of informatics

**IV. Learning Autonomy Competencies (20%)**

**a) How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

1. **Independent Learning:** Students should be able to find answers to the questions that are not covered directly in the course. This requires the ability to search for and locate appropriate information.
2. **Knowledge Integration and Application:** The student should be able to relate the self-acquired information to what they already know; and build (apply) upon the newly acquired knowledge.

**b) How will you help students learn it? (in class or out of class)**
1. Reading Material: Each week a series of reading material is provided to the students.  Several articles are posted since students are all coming from different backgrounds (educational, professional). The assigned and independent readings as well as the mini lecture will be helpful in structuring the discussion.

**c) How could you measure each of the desired behaviors listed before? (b)**

1. **Course Paper (20%):** As discussed before, students are required to propose an evaluation matrix. Students are required to critically apply the acquired knowledge and find additional information if needed. Proper feedback is directly provided to each student (as comments) to enhance the self-learning outcome.
2. **Online Project (45%):** The assignment requires application of course content.  Some independent readings may be required to successfully complete the assignment.

**d) What are the assessment findings? (c)**

*The following findings are based on previous years in which the same syllabus and course organization was used.*

1. **Course Paper**: In previous years, most of the students have been successful in learning, collecting and analyzing new information on their own. This fact might be attributed to the maturity of health informatics students (i.e., they often have multiple years of working experience).

Cross-discipline searches have been often challenging for students. For example, a student with a computer science background may find it hard to search for medical literature or study them on his/her own.

2. **Online Discussions:**  The average score of self-learning-activities is assessed in the discussion rubric.  For a maximum score, student must posting demonstrate that all assigned reading is applied and referenced and student adds additional referenced information and/or resources.

   Early in the semester very few students offer additional references; references to independent readings become more customary toward mid-semester.

3. **Online Projects:**  The average score of self-learning-activities during the project is indirectly assessed through participation in project by the project mentor and faculty.

**e) How will the aggregated assessment findings be used to improve your program?**

1. **Low Score Scenario:** A consistent low average score of students across aforementioned measuring tools (e.g., course paper and/or assignments) indicates a need for additional attention to the importance of self-learning in long term. .
2. **High Score Scenario:** is desired since self-learning activities are posted every week and included in the discussion assignment.
3. **Course Current Status:** Currently, self-directed learning activities are weak early in the semester yet improve considerable toward mid-semester. Early feedback on the importance of self-directed learning in graduate education aims at increase those activities early in the course.
4. **Aggregated Findings:** Self-learning is vital in health informatics. Both health and informatics sciences are constantly changing and students should be able to learn and updated themselves after they graduate. The health informatics program should include activities or projects in its curriculum to ask for such tasks.

**V. Judgment Competencies (10%)**

**a) How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**
1. **Scholarly Judgment:** The students should be able to discuss a health informatics issue by identifying the problem components, define the relevant relationship between the components, and describe the problem boundaries (i.e. How many ways can we think about the problem), and generate potential solutions to the problem.

2. **Human Ethics:** Frequently health informatics deals with sensitive data. The students should be able to understand these issues and consider them in their future work. For example, students should know the basics of privacy and security issue involved in health information exchange.

**b) How will you help students learn it? (in class or out of class)**
1. **Discussion Forum:** Often controversial topics are posted online. The arguments and counter-arguments will help developing judgmental competencies in students.
2. **Independent Readings Quality:** Students are required to judge the quality of the reviewed literature before including them into the discussions and/or written assignments.

**c) How could you measure each of the desired behaviors listed before?**
1. **Discussion Forum (35%):** Judgment competencies in online discussions are indirectly evaluated by:
   a. **Level of cognition:** the degree to which the student's postings represent basic knowledge recall, comprehension, application or higher levels of cognition such as analysis, evaluation or synthesis from the readings/discussion.
   b. **Answer development and logic:** the degree to which the student's postings logically address and develop the questions posed in the assignment.

**d) What are the assessment findings?**
   *The following findings are based on previous years in which the same syllabus and course organization was used.*
1. **Course Paper:** Judgment competencies are evaluated by requesting an evaluation matrix of an EHR implementation at three different points in time. Although guidelines for evaluation and evaluation studies are published, none related the 3 points in time. With adequate feedback, students are able to apply these competencies in their paper (grades range from 80 to 100%).
2. **Discussion Forum:** see earlier

**e) How will the aggregated assessment findings be used to improve your program?**

1. **Low Score Scenario:** A consistent low score across aforementioned measuring tools indicates a possible problem in the teaching methodology. Evaluation of teaching-learning processes is required
2. **High Score Scenario:** A high score scenario is not applicable.

3. **Course Current Status:** Currently, the course demonstrates satisfactory judgment skills from students in the assignments and discussions. Students are continually reminded of those competencies in their weekly course activities

4. **Aggregated Findings:** Judgment competency is vital in healthcare, and consequently in healthcare information. This course covers in-depth discussion on research methods, ethical considerations, and involves a real-world project.

(a) *The share of each competency in the total competency target level of this course is shown in percentage. The total of shares (first column) sums up to 100%.*

(b) *The effect of each measurement tool in assessing a certain competency is shown in percentage. The total of tools in each competency (row) sums up to 100%*

(c) *Findings are based on the courses offered in the previous years in which the same syllabus was used.*

| SoI - Media Arts and Science MS Program | | | | | |
|---|---|---|---|---|---|
| | Degrees Awarded | Certificates Awarded | Percent Employed | Average Salary | Ph.D. Acceptances |
| 2008-2009 | 9 | 0 | 75% | 29,000 | 13% |
| 2009-2010 | 4 | 0 | 60% | 42,000 | -- |
| 2010-2011 | 10 | 0 | 85% | $42,125 | -- |

D. **Assessment Project: Graduate Curriculum (new)**

The MAS graduate program (an MS degree) is relatively small, although we are seeing increases in enrollment, applicants, and applicant quality. The program continues to try to find the appropriate balance between research and professional practice. This is to be expected for a program that is relatively new and that deals with subject matter that can be viewed as substantially skills-oriented. In this assessment project, we will use student feedback to measure the contribution of each of our courses to the high-level objectives that have been established for the program.

Now that the MAS Undergraduate Curriculum has been revised, and is underway, focus has turned to the Graduate Curriculum. During the spring 2011 semester, a Graduate Curriculum Committee was formed and met to begin discussion on this important area. This committee will resume its charge in the fall 2011 semester. The initial focus will be on the three core courses that makeup the

foundation of the MAS Graduate Program (N500 Principles of Multimedia Technology, N501 Foundations of Digital Production and, N503 Digital Media Application and Design Processes.

General assessment issues:

**a) What general outcome are you seeking?**
The curriculum is optimally suited to meeting the program's high-level objectives and student learning outcomes.

**b) How would you know it if you saw it? What will the student know or be able to do?**
Students graduating from the program are able to:

- Design and create digital media products that are targeted to a specific purpose and that meet professional standards for quality
- Plan a coordinated collection of multi-media or trans-media communications and/or experiences, using each medium to good advantage
- Assess media communications and/or experiences, discriminating among features that influence effectiveness
- Recommend strategies, practices, and/or tools appropriate to a problem
- Predict future trends and developments in digital media, based on examination of the history, tradition, and current drivers in the field
- Communicate in written and oral form to a range of audiences

**c) What opportunities do students have to learn it?**
Courses in the curriculum, including recommended electives, are intended to provide opportunities to reach these learning outcomes.

**d) How will you measure each of the desired behaviors listed above?**
Through student survey.

**e) What are the assessment findings?**
Deferred until project completion.

**f) What improvements have been made based on assessment findings?**
Deferred until project completion.

**Assessment Project 2: Review of Course N500 (Principles of Multimedia Technology), Fall 2010 Edition**

**a) What general outcome are you seeking?**

The course objectives for N500 include each graduate student acquiring the following:

Knowledge and Understanding (Issues about technology in multimedia), students will identify, describe, and apply:
* The effective use of technology in multimedia
* Analyze the most current and interesting issues in digital media technology
* Analyze and present evaluative feedback on several case studies
* Become engaged in controversial and important social issues in digital media communication and technology
* Define issues relating to copyright and ownership and explain how they impact digital media technology


Application of Knowledge (The use of digital media technology) students will apply and demonstrate:
* The ability to work with elements (text, graphics, sound, and video) on a multimedia project or web site design
* Demonstrate the ability to work in a team environment producing a pre-defined product in Media Arts and Science.
* Demonstrate efficient time and production management using project development

Writing, Communication and Presentation Competencies:
* Demonstrate effective writing skills at the graduate level in the area of Media Arts and Science. This outcome also addresses academic writing using an APA style.
* Demonstrate effective presentation and delivery skills using an instructional design sequence in an applied area in Media Arts and Science.

**b) How would you know it (the outcome) if you saw it? (What will the student know or be able to do?)**

Students will demonstrate achievement of the learning objectives if the following criteria are met:

- Above 80% in class discussion and participation
- Above 80% in a solo multimedia project design
- Above 80% in solo multimedia technology application presentation
- Above 80% in each of 8 quizzes
- Above 90% in a formal instructional design project
- Above 80% in a team (collaborative) multimedia project presentation

**c) What opportunities do students have to learn it?**

Students will have the following opportunities to demonstrate achievement in the learning outcomes by:

- Readings: Ten reading assignments are required as part of this course. Students are expected to engage in class discussion on issues related to each article.

- Quizzes:  Eight online quizzes based on the readings.

- Class Participation – Participate in class discussion on readings assigned each week.

- Presentations – Design, develop and present a presentation in the use of multimedia technology.  Presentations will consist of solo and team based formats. Presentations are graded for clarity, structure, grammar, spelling, and peer review.

- Team Project: Instructional Analysis, Design, Development, Implementation, and Evaluation (ADDIE) project.

- Final Project: Design and develop a quality project that would exemplify contribution to the student's portfolio.  Projects are graded based on comprehensiveness, creativity, effectiveness, execution, adherence to a production schedule, and ability to follow instructions.


**d) How are you measuring each of the desired behaviors listed in #1?**

*Knowledge and understanding about technology issues in multimedia*

- Class Participation            (10%)
- Quizzes (8)                    (15%)

*Application of Knowledge*
- Solo Project/Presentation      (30%)
- Team Project/Presentation      (30%)

*Written Communication and Presentation Competencies:*

- Instructional Design Project   (15%)

**e) What are the assessment findings?**

The findings indicate that N500 students (N = 20) have achieved a very high standard demonstrating the learning outcomes specified for this course.

Principles of Graduate Learning Grading Scale:

- Very effective (90 – 100) = 4
- Effective (80 – 89) = 3
- Somewhat effective (70-79) = 2
- Not effective (69 – 0) = 1

| N500 - Principles of Multimedia Technology | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Section: 2901** | | | | | | | | | | |
| | 100% | 10% | 30% | 30% | 15% | 15% | 100% | 20% | 30% | 50% |
| | Knowledge & | Written Discussion | Solo | Team | | | Application of | Instructional | | |
| | Understanding | Readings | Multimedia | Multimedia | Final Proj. | Quiz | Knowledge | Instructional | Team | Final |
| | Compentencies | Class | Presentation | Presentation | Report | | Compentencies | Design | Project | Project |
| **Student** | | Participation | | | | | | | | |
| Student 1 | 3 | 100.00 | 10.00 | 50.00 | 100.00 | 68.00 | 4 | 197.25 | 100 | 100 |
| Student 2 | 4 | 100.00 | 10.00 | 50.00 | 100.00 | 76.00 | 4 | 200 | 100 | 100 |
| Student 3 | 3 | 80.00 | 10.00 | 50.00 | 90.00 | 73.00 | 3 | 198 | 100 | 90 |
| Student 4 | 3 | 80.00 | 10.00 | 50.00 | 100.00 | 74.00 | 4 | 194 | 100 | 100 |
| Student 5 | 3 | 100.00 | 10.00 | 50.00 | 100.00 | 79.00 | 4 | 200 | 100 | 100 |
| Student 6 | 3 | 80.00 | 10.00 | 50.00 | 100.00 | 56.00 | 4 | 200 | 100 | 100 |
| Student 7 | 2 | 60.00 | 10.00 | 50.00 | 100.00 | 77.00 | 4 | 197 | 100 | 100 |
| Student 8 | 3 | 80.00 | 10.00 | 50.00 | 100.00 | 75.00 | 4 | 196.25 | 100 | 100 |
| Student 9 | 3 | 80.00 | 10.00 | 50.00 | 100.00 | 76.00 | 4 | 200 | 100 | 100 |
| Student 10 | 4 | 100.00 | 10.00 | 50.00 | 100.00 | 68.00 | 4 | 198 | 100 | 100 |
| Student 11 | 3 | 80.00 | 10.00 | 50.00 | 100.00 | 75.00 | 4 | 199 | 100 | 100 |
| Student 12 | 3 | 80.00 | 10.00 | 50.00 | 100.00 | 75.00 | 4 | 195.75 | 100 | 100 |
| Student 13 | 2 | 60.00 | 10.00 | 50.00 | 80.00 | 64.00 | 3 | 190 | 100 | 80 |
| Student 14 | 2 | 80.00 | 10.00 | 50.00 | 100.00 | 58.00 | 4 | 199 | 100 | 100 |
| Student 15 | 4 | 90.00 | 10.00 | 50.00 | 85.00 | 63.00 | 3 | 196.5 | 100 | 85 |
| Student 16 | 3 | 90.00 | 10.00 | 50.00 | 100.00 | 78.00 | 4 | 196 | 100 | 100 |
| Student 17 | 4 | 100.00 | 10.00 | 50.00 | 100.00 | 74.00 | 4 | 195 | 100 | 100 |
| Student 18 | 4 | 100.00 | 10.00 | 50.00 | 100.00 | 79.00 | 4 | 200 | 100 | 100 |
| Student 19 | 3 | 80.00 | 10.00 | 50.00 | 100.00 | 72.00 | 4 | 200 | 100 | 100 |
| Student 20 | 2 | 60.00 | 10.00 | 50.00 | 100.00 | 75.00 | 4 | 200 | 100 | 100 |
| | | | | | | | | | | |
| 5 students | 25% | Very effective demonstrration of the Principles of Graduate Learning | | | | | 17 Students | 85% | Very effective demonstrration of the Principles of Graduate Learning | |
| 11 students | 55% | Effective demonstrration of the Principles of Graduate Learning | | | | | 3 Students | 15% | Effective demonstrration of the Principles of Graduate Learning | |
| 4 students | 20% | Somewhat effective demonstrration of the Principles of Graduate Learning | | | | | | | | |

**f) What improvements have been made based on assessment findings?**

In preparing for the upcoming fall 2011 semester, significant adjustments have been made in the area of Knowledge and Understanding of Competencies. From the data it is apparent that students are ill-prepared in cognitive areas related to academic writing, articulation (both verbal and non-verbal), and argument. Students demonstrate higher proficiency in applied areas (Application of Knowledge Competencies).

Adjustments for the upcoming semester include additional lecture content, in-class practice exercises, and peer-reviews of each others' work during class time. These opportunities will help students become more comfortable in communicating and forming argument based on the course content presented each week.

The Media Arts and Science Program outlined several learning outcomes listed below. These outcomes will provide the necessary focus on additional revisions of N500 Principles of Multimedia Technology.

Upon completion of the MS Program, Media Arts and Science students are able to:

- Design and create digital media products that are targeted to a specific purpose and that meet professional standards for quality
- Plan a coordinated collection of multi-media or trans-media communications and/or experiences, using each medium to good advantage
- Assess media communications and/or experiences, discriminating among features that influence effectiveness
- Recommend strategies, practices, and/or tools appropriate to a problem
- Predict future trends and developments in digital media, based on examination of the history, tradition, and current drivers in the field
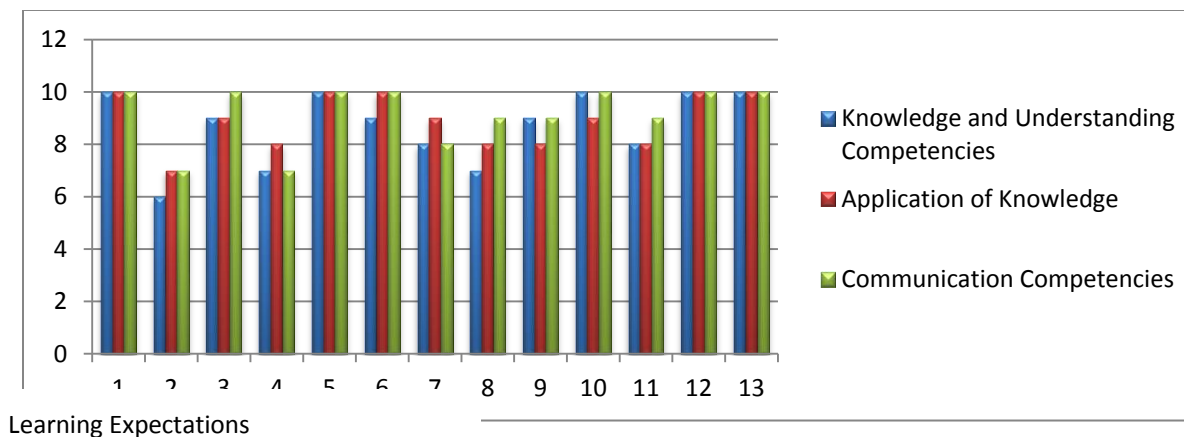- Communicate in written and oral form to a range of audiences.

| SoI - Bioinformatics MS Program | | | | | |
|---|---|---|---|---|---|
| | Degrees Awarded | Certificates Awarded | Percent Employed | Average Salary | Ph.D. Acceptances |
| 2008-2009 | 5 | 0 | 100% | 35,000 | -- |
| 2009-2010 | 5 | 0 | 70% | NA | 20% |
| 2010-2011 | 9 | 0 | 70% | 45,333 | 0 |

See below

| Informatics - Ph.D. Program – Bioinformatics Track | | | | |
|---|---|---|---|---|
| | Degrees Awarded | Certificates Awarded | Percent Employed | Average Salary |
| 2008-2009 | 0 | 0 | | |
| 2009-2010 | 1 | 0 | 100% | --- |
| 2010-2011 | 4 | 0 | 75% | --- |

The assessment of the overall PhD Program in Bioinformatics is carried out in different areas of expectations. In 2010-2011, the assessment was focused on bioinformatics knowledge competency. For assessing this area of the program, we used the learning outcomes from the Introductory Bioinformatics course, INFO 519. This competency was measured using two criteria, homework and projects and on three different competency metrics, namely, Knowledge and Understanding Competencies, Application of Knowledge, and Communication Competencies.

The assessment of this competency for the PhD program was carried out in the INFO 519 class and the chart below shows the results for (N=13). In the chart given below, the x-axis shows the three learning outcomes that are assessed for 13 students and the y-axis shows the actual scores.



Learning Expectations

Base on the above analysis, we observed that the average student learning outcomes for the three measured parameters were as follows: for the Knowledge and Understanding Competencies category, the student average was 8.69/10, for the Application of Knowledge category, the average was 8.92/10, and for the Communication Competencies category had an average of 9.25/10.

In summary, the Knowledge Understanding Competencies assessment aspect of our ongoing evaluation of the PhD program revealed that this outcome is at a satisfactory performance level. Assessment of this specific component will be repeated every two years. During the coming academic year, we will be focusing on assessing other aspects of our PhD program.