INFO B530
Foundations of Health Informatics
Department of BioHealth Informatics
Indiana University School of Informatics and Computing, Indianapolis
Fall 2014

Section No.: 26505 Credit Hours: 3
Time: Web
Location: Web
First Class: August 25, 2014
Website: https://oncourse.iu.edu/portal/site/FA14-IN-INFO-B530-26505

Instructor: Robin Chisholm, PhD in Health Informatics, Adjunct Faculty
Office Hours: By Appointment
Office: Web conferencing

Phone: (317) 644-1989 (Cell)
Email: rlchisho@iu.edu

Prerequisites: None

COURSE DESCRIPTION

This course will introduce the foundation of health informatics. It will review 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 will be explored.

Required Text(s):
Title: Health Informatics: Practical Guide for Healthcare and Information Technology Professionals (6th edition)
Author(s): Hoyt, Robert
Publisher: Lulu.com
Book site: http://www.informaticseducation.org/index.html
ISBN: 1304791106

Available at Amazon.com in print or ebook (kindle) or from the publisher as a PDF.

Additional Readings: (if required)
Additional readings posted weekly in oncourse

Principles of Graduate and Professional Learning (PGPL)
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Learning outcomes are assessed in the following areas:

1. Knowledge and skills mastery (K&S)
   - Major focus areas in health informatics
   - Informatics research and systematic review
2. Critical thinking and good judgment (CT)
3. Effective communication (EC)
4. Ethical behavior (EB)

Student Learning Outcomes:
The learning objectives of this course include the following:

1. Understand the state of science of informatics research and practice.
2. Describe and critically appraise current practices and business processes in health informatics.
3. Understand the social, ethical and policy implications of health informatics practices.
4. Describe current health informatics application challenges and opportunities.

Software used:
General productivity software

EXPECTATIONS, GUIDELINES, AND POLICIES

Communication:
The best method to contact your instructor is via email at rlichisho@iu.edu. You are welcome to call or text to 317-644-1989. Phone calls will usually go to voice mail so be sure to leave a call back number and a time period for me to return the call. I will respond to email or voicemail within 24 hours. If it is an emergency designate “Emergency” in the subject line and I will answer as soon as I can. Messages in Oncourse will forward to my email and I will respond to them within 24 hours as well. Emails or messages that are of interest to the entire class will be answered in Oncourse messages.

Attendance:
A basic requirement of this course is that you will participate in all class meetings, whether online or face-to-face, and conscientiously complete all required course activities and assignments. The instructor is required to submit to the Registrar a record of student attendance, and action shall be taken if the record conveys a trend of absenteeism.

Only the following are acceptable excuses for absences: death in the immediate family (e.g. mother, father, spouse, child, or sibling), hospitalization or serious illness; jury duty; court ordered summons; religious holiday; university/school coordinated athletic or scholastic activities; an unanticipated event that would cause attendance to result in
substantial hardship to one’s self or immediate family. Absences must be explained with the submission of appropriate documentation to the satisfaction of the instructor, who will decide whether missed work may be made up. Absences that do not satisfy the above criteria are considered unexcused. To protect your privacy, doctor’s excuses should exclude the nature of the condition and focus instead on how the condition impacts your attendance and academic performance.

Incomplete:
The instructor may assign an Incomplete (I) grade only if at least 75% of the required coursework has been completed at passing quality and holding you to previously established time limits would result in unjust hardship to you. All unfinished work must be completed by the date set by the instructor. Left unchanged, an Incomplete automatically becomes an F after one year. http://registrar.iupui.edu/incomp.html

Deliverables:
You are responsible for completing each deliverable (e.g., assignment, quiz) by its deadline and submitting it by the specified method. Deadlines are outlined in the syllabus or in supplementary documents accessible through OnCourse. In fairness to the instructor and students who completed their work on time, a grade on a deliverable shall be reduced 10%, if it is submitted late and a further 10% for each 24-hour period it is submitted after the deadline.

Exams/quizzes:
There will only be one quiz (week 1) a midterm exam (week 9) and a final exam (finals week). The week 1 quiz will be based on the syllabus and class procedures. The midterm and final exams will be essay questions based on the discussion boards and article reviews. You will be allowed 90 minutes to complete your choice of 3 questions chosen from 6 posted questions. It is important for you to read the discussion boards (main weekly summary forum) and article reviews prior to the exams as you will not have time to find the information during the exam.

Discussion board assignments:
1. Every other week (starting week 3) you will review an article from an online informatics news source as assigned and post the review by Sunday at 11:59 pm in the appropriate forum. The article review should include the bibliographic citation (properly formatted), why the article was chosen, its impact on health informatics, and a brief summary of the article. See week 1 resources for assigned online news sources listed by groups.
2. By Wednesday at 11:59 pm each week, post the three “take home” points from the weekly readings in the form of a tweet (144 characters – spaces do not count as characters). You will not be able to see what others in your group have posted until you post. By Sunday at 11:59 pm, as a group, discuss why these points are important for health informatics and a clinical scenario where they would be important. Develop a group consensus of the three most important points for the weekly readings, why they are important and the clinical scenario to post to the
main weekly forum. Each group will be responsible for appointing a different 
person each week to post to the main forum. Grading will be based on individual 
effort (Wednesday) and group effort (discussion and main forum posting).

Class assignments:
The project for this course is a systematic review done with a team. By the end of week 2 
(September 7), you will need to sign up for a general topic on the Wiki page in Oncourse. 
General topic groups will work together to narrow the scope to a specific topic that must 
be approved by the instructor. See assignments for resources to perform the systematic 
review. This project is due at the end of week 16 (before finals week). More information 
about this project can be found in the resources section in Oncourse.

Grading Information:

- Weekly article summaries - 30%
  - 5 points each
- Weekly discussion board - 25%
  - 5 points for Wednesday posting
  - 5 points for Sunday group posting and discussion
- Midterm exam and syllabus quiz - 35%
  - 10 points for Syllabus quiz
  - 150 points for midterm exam
  - 150 points for final exam
- Systematic review or literature review – 10%

Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Description</th>
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<tbody>
<tr>
<td>A+</td>
<td>97 – 100</td>
<td>Outstanding achievement</td>
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<tr>
<td>A</td>
<td>93 – 100</td>
<td>Excellent achievement</td>
</tr>
<tr>
<td>A−</td>
<td>90 – 92.99</td>
<td>Very good performance and quality of work</td>
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<tr>
<td>B+</td>
<td>87 – 89.99</td>
<td>Good performance and quality of work</td>
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<tr>
<td>B</td>
<td>83 – 86.99</td>
<td>Modestly acceptable performance and quality of work</td>
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<tr>
<td>B−</td>
<td>80 – 82.99</td>
<td>Marginal acceptable performance and quality of work</td>
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<tr>
<td>C+</td>
<td>77 – 79.99</td>
<td>Unacceptable work (Core course must be repeated for credit)</td>
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<tr>
<td>C</td>
<td>73 – 76.99</td>
<td>Unacceptable work (Core course must be repeated for credit)</td>
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<tr>
<td>C−</td>
<td>70 – 72.99</td>
<td>Unacceptable work (Course must be repeated for credit)</td>
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<tr>
<td>D+</td>
<td>67 – 69.99</td>
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<td>D−</td>
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<tr>
<td>F</td>
<td>Below 60</td>
<td>Unacceptable work (Course must be repeated for credit)</td>
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## WEEKLY SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Learning Objectives</th>
<th>Reading Assignments, Homework</th>
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</table>
| 1    | Overview of health informatics | • History and overview  
• Identify the perceived benefits of Health Informatics  
• State the impact of the HITECH act  
• List the barriers to HIT adoption | Read Ch. 1  
Discussion Board  
Article Review  
Syllabus Quiz |
| 2    | Healthcare Data, Information and Knowledge | Data Standards  
• Define data, information and knowledge  
• Understand how vocabularies convert data to information  
• Describe methods that convert information to knowledge  
• Distinguish informatics from other computational disciplines, particularly computer science  
• Describe the differences between data-centric and information-centric technologies  
• Enumerate the reasons why data standards are necessary for interoperability  
• Discuss the importance of electronic clinical summaries or Continuity of Care Documents (CCDs) or Continuity of Care Records (CCRs) and C-CDAs | Read Ch. 2, 6  
Discussion Board  
Article Review |
| 3    | Information Retrieval and Online Medical Resources | • State the challenges of staying current for the average clinician  
• Describe the characteristics of an ideal educational resource  
• Describe the future of digital resources integrated with electronic health records  
• State the significance of rapid high quality medical searches  
• Define the role of Google and Google Scholar in healthcare  
• Describe the role of PubMed and Medline searches  
• Identify the variety of search filters essential to an excellent PubMed search | Ch. 12, 13 |
| 4    | Evidence Based Practice | • State the definition and origin of evidence based medicine  
• Define the benefits and limitations of evidence based medicine. | Ch. 14 |
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<tr>
<th>Chapter</th>
<th>Section</th>
<th>Topics</th>
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</table>
| 5       | Data Analytics | • Describe the difference between descriptive, predictive and prescriptive analytics  
• Outline the characteristics of “Big Data”  
• Enumerate the necessary skills for a worker in the data analytics field  
• List several limitations of healthcare data analytics  
• Discuss the critical role electronic health records play in healthcare data analytics |
| 6       | Ethics, Privacy & Security | • Describe privacy and security measures contained in HIPAA, the HITECH Act and Meaningful Use  
• Recognize the importance of data privacy as related to public perception, particularly in regards to data breach and loss  
• Enumerate the definitions of confidentiality, availability and integrity.  
• Discuss security standards and the laws intended to protect health data  
• Describe the 20th century medical and computing background to health informatics ethics  
• Describe the complexities in the relationship between ethics, law, culture and society  
• Summarize the most pertinent ethical principles in health informatics ethics |
| 7       | Electronic health records | • Functional components of and EHR  
• Benefits of an EHR  
• How does an EHR differ from a paper record?  
• Application for clinical care |
| 8       | Health Information Exchange | • Identify the need for and benefits of health information exchange and interoperability  
• Describe the concept of Health Information Organizations (HIOs) and how they interact with the Nationwide Health Information Network (NwHIN) or eHealth Exchange  
• Detail the obstacles facing HIOs |
<table>
<thead>
<tr>
<th>9</th>
<th>Midterm Exam</th>
<th>• Understand the future direction of HIOs and the impact of Meaningful Use</th>
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| 10 | Public Health Informatics and Disease Registries | • Define public health surveillance and how data is used in public health  
• Explain the significance of information technology in the field of public health  
• Explain the significance and scope of global public health informatics  
• List several of the current surveillance systems used in the field of public health  
• Explain the function and purpose of the Public Health Information Network  
• Describe the need for rapid retrieval of patient and population statistics to manage patients with chronic diseases  
• Compare and contrast the various disease registry formats including those that integrate with electronic health records  
• Describe the interrelationships between disease registries, evidence based medicine and quality improvement strategies |
| 11 | Quality Assurance, Patient Safety and HIT | • Identify why patient safety is a national concern  
• Define medical errors, adverse events and preventable adverse events  
• Compare and contrast how information technology can potentially improve or worsen patient safety  
• List the various technologies that are likely to improve medication error rates  
• Identify the obstacles to widespread implementation of patient safety initiatives  
• Define quality medical care and how it relates to patient safety  
• State the goals of quality improvement (QI) programs  
• List the components of the Quality Improvement Roadmap and National Quality Strategy  
• Describe how health information technology (HIT) can support QI  
• List the concerns and limitations of current QI programs for the average clinician |

Ch. 15, 21

Ch. 16, 17
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<th>Section</th>
<th>Topics</th>
<th>Chapters</th>
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| 12   | Clinical Research        | • Understand the scope of eResearch and clinical research informatics with the clinical research workflow  
• Describe the use of EHR data in various phases of research including research originating from EHR data  
• Conceptualize how informatics tools can be utilized in recruiting subjects for clinical research  
• Detail how informatics supports the ongoing management of clinical trials  
• Review the new trends in big data, real-time analytics and data mining | Ch. 22   |
| 13   | Mobile and Consumer    | • Identify the origin of consumer health informatics (CHI)  
• Identify and discuss CHI tools  
• Discuss the features and format of personal health records  
• Identify electronic tools for patient to physician communication  
• Outline barriers to CHI adoption  
• Discuss the future of CHI  
• Describe the history of medical mobile technology and the evolution from personal digital assistants to smartphones  
• List the various ways mobile technology is currently being used in healthcare today  
• Compare and contrast mobile technology for clinicians and patients  
• Identify the limitations of handheld technology | Ch. 10, 11 |
| 14   | Natural language        | • What is NLP?  
• Potential uses of NLP  
• Principal techniques of NLP | Ch. 8 (Shortliffe) |
| 15   | Telemedicine             | • State the differences between telehealth and telemedicine  
• List the various types of telemedicine, such as teleradiology and teleneurology  
• List the potential benefits of telemedicine to patients and clinicians  
• Identify the different means of transferring information with telemedicine, such as store and forward  
• Enumerate the most significant ongoing telemedicine initiatives | Ch. 18   |
16 | Medical Imaging Informatics | • Describe the history behind digital radiology and the creation of picture archiving and communication systems (PACS)  
• Enumerate the benefits of digital radiology to clinicians, patients and hospitals  
• List the challenges facing the adoption of PACS  
• Describe the difference between computed and digital radiology  
• Understand the new possibilities with web-based PACs and images on mobile devices | Ch. 19

**CODE OF CONDUCT**

All students should aspire to the highest standards of academic integrity. Using another student’s work on an assignment, cheating on a test, not quoting or citing references correctly, or any other form of dishonesty or plagiarism shall result in a grade of zero on the item and possibly an F in the course. Incidences of academic misconduct shall be referred to the Department Chair and repeated violations shall result in dismissal from the program.

All students are responsible for reading, understanding, and applying the *Code of Student Rights, Responsibilities and Conduct* and in particular the section on academic misconduct. Refer to *The Code > Responsibilities > Academic Misconduct* at [http://www.indiana.edu/~code/](http://www.indiana.edu/~code/). All students must also successfully complete the Indiana University Department of Education “How to Recognize Plagiarism” Tutorial and Test. [https://www.indiana.edu/~istd](https://www.indiana.edu/~istd) You must document the difference between your writing and that of others. Use quotation marks in addition to a citation, page number, and reference whenever writing someone else’s words (e.g., following the *Publication Manual of the American Psychological Association*). To detect plagiarism instructors apply a range of methods, including Turnitin.com. [http://www.ulib.iupui.edu/libinfo/turnitin](http://www.ulib.iupui.edu/libinfo/turnitin)

**Academic Misconduct:**

1. **Cheating:** Cheating is considered to be an attempt to use or provide unauthorized assistance, materials, information, or study aids in any form and in any academic exercise or environment.
   a. A student must not use external assistance on any “in-class” or “take-home” examination, unless the instructor specifically has authorized external assistance. This prohibition includes, but is not limited to, the use of tutors, books, notes, calculators, computers, and wireless communication devices.
   b. A student must not use another person as a substitute in the taking of an examination or quiz, nor allow other persons to conduct research or to prepare
work, without advanced authorization from the instructor to whom the work is being submitted.

c. A student must not use materials from a commercial term paper company, files of papers prepared by other persons, or submit documents found on the Internet.

d. A student must not collaborate with other persons on a particular project and submit a copy of a written report that is represented explicitly or implicitly as the student’s individual work.

e. A student must not use any unauthorized assistance in a laboratory, at a computer terminal, or on fieldwork.

f. A student must not steal examinations or other course materials, including but not limited to, physical copies and photographic or electronic images.

g. A student must not submit substantial portions of the same academic work for credit or honors more than once without permission of the instructor or program to whom the work is being submitted.

h. A student must not, without authorization, alter a grade or score in any way, nor alter answers on a returned exam or assignment for credit.

2. Fabrication: A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citation to the sources of information.

3. Plagiarism: Plagiarism is defined as presenting someone else’s work, including the work of other students, as one’s own. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged, unless the information is common knowledge. What is considered “common knowledge” may differ from course to course.

a. A student must not adopt or reproduce ideas, opinions, theories, formulas, graphics, or pictures of another person without acknowledgment.

b. A student must give credit to the originality of others and acknowledge indebtedness whenever:
   1. directly quoting another person’s actual words, whether oral or written;
   2. using another person’s ideas, opinions, or theories;
   3. paraphrasing the words, ideas, opinions, or theories of others, whether oral or written;
   4. borrowing facts, statistics, or illustrative material; or
   5. offering materials assembled or collected by others in the form of projects or collections without acknowledgment

4. Interference: A student must not steal, change, destroy, or impede another student’s work, nor should the student unjustly attempt, through a bribe, a promise of favors or threats, to affect any student’s grade or the evaluation of academic performance. Impeding another student’s work includes, but is not limited to, the theft, defacement, or mutilation of resources so as to deprive others of the information they contain.

5. Violation of Course Rules: A student must not violate course rules established by a department, the course syllabus, verbal or written instructions, or the course materials
that are rationally related to the content of the course or to the enhancement of the learning process in the course.

6. **Facilitating Academic Dishonesty:** A student must not intentionally or knowingly help or attempt to help another student to commit an act of academic misconduct, nor allow another student to use his or her work or resources to commit an act of misconduct.

**OTHER POLICIES**

1. **Right to revise:** The instructor reserves the right to make changes to this syllabus as necessary and, in such an event, will notify students of the changes immediately.

2. **IUPUI course policies:** A number of campus policies governing IUPUI courses may be found at the following link: [http://registrar.iupui.edu/course_policies.html](http://registrar.iupui.edu/course_policies.html)

3. **Classroom civility:** To maintain an effective and inclusive learning environment, it is important to be an attentive and respectful participant in lectures, discussions, group work, and other classroom exercises. Thus, unnecessary disruptions should be avoided, such as ringing cell phones engagement in private conversations and other unrelated activities. Cell phones, media players, or any noisy devices should be turned off during a class. Texting, surfing the Internet, and posting to Facebook or Twitter during class are generally not permitted. Laptop use may be permitted if it is used for taking notes or conducting class activities. Students should check with the instructor about permissible devices in class. IUPUI nurtures and promotes “a campus climate that seeks, values, and cultivates diversity in all of its forms and that provides conditions necessary for all campus community members to feel welcomed, supported, included, and valued” (IUPUI Strategic Initiative 9). IUPUI prohibits “discrimination against anyone for reasons of race, color, religion, national origin, sex, sexual orientation, marital status, age, disability, or [veteran] status” (Office of Equal Opportunity). Profanity or derogatory comments about the instructor, fellow students, invited speakers or other classroom visitors, or any members of the campus community shall not be tolerated. A violation of this rule shall result in a warning and, if the offense continues, possible disciplinary action.

4. **Bringing children to class:** To ensure an effective learning environment, children are not permitted to attend class with their parents, guardians, or childcare providers.

5. **Course Evaluation Policy:** Course evaluations provide vital information for improving the quality of courses and programs. Students are required to complete one course and instructor evaluation for each section in which they are enrolled at the School of Informatics and Computing. This requirement has three exceptions: (a) The student has withdrawn from the course; (b) only one student is enrolled in the section (in which case anonymity is impossible); and (c) the section is a laboratory that must be taken with a course having a different section number. Course evaluations are completed at [https://soic.iupui.edu/app/course-eval/](https://soic.iupui.edu/app/course-eval/). Course evaluations are open from the eleventh week. Course evaluations are anonymous, which means that no one can view the name of the student completing the evaluation. In addition, no one can view the evaluation itself until after the instructor has submitted the final grades for the
course. In small sections, demographic information should be left blank, if it could be used to identify the student. A course evaluation must close before the grade for that course can be released. To ensure students have had ample opportunity to complete the evaluation, an uncompleted course evaluation could delay the release of the grade for up to a week.

6. **Communication:** The instructor should respond to emails within 48 hours, excluding weekends and holidays, and announce periods of extended absence in advance. The instructor should provide weekly office hours or accept appointments for face-to-face, telephone, or teleconferenced meetings.

7. **Email:** Indiana University uses your IU email account as an official means of communication, and students should check it daily for pertinent information. Although you may have your IU email forwarded to an outside email account, please email faculty and staff from your IU email account.

8. **Disabilities Policy:** In compliance with the Americans with Disabilities Act (ADA), all qualified students enrolled in this course are entitled to reasonable accommodations. Please notify the instructor during the first week of class of accommodations needed for the course. Students requiring accommodations because of a disability must register with Adaptive Educational Services (AES) and complete the appropriate AES-issued before receiving accommodations. The AES office is located at UC 100, Taylor Hall (Email: aes@iupui.edu, Tel. 317 274-3241). Visit [http://aes.iupui.edu](http://aes.iupui.edu) for more information.

9. **Administrative Withdrawal:** A basic requirement of this course is that students participate in all class discussions and conscientiously complete all required course activities and/or assignments. If a student is unable to attend, participate in, or complete an assignment on time, it is the student’s responsibility to inform the instructor. If a student misses more than half of the required activities within the first 25% of the course without contacting the instructor, the student may be administratively withdrawn from this course. Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal will take place after the full refund period, and a student who has been administratively withdrawn from a course is ineligible for a tuition refund. Contact the instructor with questions concerning administrative withdrawal.

10. **Emergency Preparedness:** Safety on campus is everyone’s responsibility. Know what to do in an emergency so that you can protect yourself and others. For specific information, visit the emergency management website. [http://protect.iu.edu/emergency](http://protect.iu.edu/emergency)

**MISSION STATEMENT**

The Mission of IUPUI is to provide for its constituents excellence in
- Teaching and Learning;
- Research, Scholarship, and Creative Activity; and
- Civic Engagement.

With each of these core activities characterized by
• Collaboration within and across disciplines and with the community;
• A commitment to ensuring diversity; and
• Pursuit of best practices.

IUPUI’s mission is derived from and aligned with the principal components—Communities of Learning, Responsibilities of Excellence, Accountability and Best Practices—of Indiana University’s Strategic Directions Charter.

STATEMENT OF VALUES

IUPUI values the commitment of students to learning; of faculty to the highest standards of teaching, scholarship, and service; and of staff to the highest standards of service. IUPUI recognizes students as partners in learning. IUPUI values the opportunities afforded by its location in Indiana’s capital city and is committed to serving the needs of its community. Thus, IUPUI students, faculty, and staff are involved in the community, both to provide educational programs and patient care and to apply learning to community needs through service. As a leader in fostering collaborative relationships, IUPUI values collegiality, cooperation, creativity, innovation, and entrepreneurship as well as honesty, integrity, and support for open inquiry and dissemination of findings. IUPUI is committed to the personal and professional development of its students, faculty, and staff and to continuous improvement of its programs and services.