# THESYLLABUS

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#### Course website

#### Texts:

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Biomedical Informatics: Computer Applications in Healthcare and Biomedicine (4th Ed.); Shortliffe and Cimino; Springer; 2014

Understanding Health Policy (7th Ed.); Bodenheimer and Grumbach; McGraw-Hill; 2016



### **BIME 535:** Clinical Care and Informatics

#### WHY WE HAVE THIS COURSE

Let's be honest. The U.S. healthcare system is a mess. To put it succinctly, it far too expensive, it delivers poor quality, far too many cannot access it due to lack of insurance, and for those who do, the experience is far too often frustrating and confusing. "Cost, quality, access and satisfaction", then, are the core challenges we face in clinical informatics.

Healthcare is, arguably, most information-intense industry in, well, the history of industry. And yet healthcare organizations have been confoundedly slow to adopt health information technology - until recently. The Great Recession of 2007 led to passage of the American Reinvestment and Recovery Act - a law that created powerful incentives for the adoption of clinical information technology. Then, in 2010, Congress enacted the Patient Protection and Affordable Care Act - legislation that has moved us rapidly towards accountable care organizations and patient-centered medical homes. While it is not yet clear what Congress and the president will do in 2017, one thing is clear - this brave new world of healthcare will only be a success if all of the actors - patients, providers, payers and policy-makers - embrace information technology and informatics. And the rather dismal track record of health information technology we've seen over the past two decades (it is argued that three out of four HIT implementations fail), it is imperative the biomedical informaticians have a deep understanding of both the domain of clinical informatics *and* as well a deep appreciation of the actual problems we are trying to solve.

The central goal of biomedical informatics is to improve health. At UW this objective plays out in four application domains: bioinformatics, public health informatics, clinical informatics and consumer informatics. Each of these domains contributes to health in different yet overlapping ways. In this course we'll explore the major issues and challenges facing clinical care today and consider the implications for biomedical and health informatics.

### WHAT WE'LL EXPLORE

We have a daunting challenge in this course - how to explore *both* the U.S. healthcare system *as well as* the research and applied domains of clinical informatics in a little over ten weeks. Just look at the Shortliffe textbook it's nearly a thousand pages! So from the start we'll need to temper our expectations. We will answer a good number of questions in the course, but we'll almost certainly generate as many questions as we answer.

In the beginning of the course we'll lay the foundation taking a tour of the healthcare system from which we can specify and clarify the core informatics research questions and application challenges towards improving health. In the remainder of the course we'll then consider the history, current status and future directions for the core clinical informatics interventions.

To better understand what you will achieve in this course it's best to start with where you need to be at the end. This starts with defining the competencies expected of an informatician. There are myriad informatics competency models that have been published - we'll consider three of these at the start of the course:

- AMIA Biomedical Informatics Core Competencies
- · AMIA Draft Applied Informatics Competencies (see Canvas)
- NCHL Health Leadership Competencies

These competency models lead us to developing our *course learning objectives,* which are based on the revised Bloom's Taxonomy:

1. Factual Knowledge Objectives. Understand, apply, analyze and evaluate:

- a. The history, current state, and future directions of healthcare in the U.S. and elsewhere, including issues of cost, quality, access and population health management.
- b. The history, current state and future directions of the principle clinical informatics applications, including electronic health records, clinical decision support systems, healthcare information systems, health information exchange, telehealth, analytics, and emerging health technologies.
- c. The ongoing challenges in clinical informatics, including the nature of biomedical data and standards; confidentiality, privacy, and security; and the bioethics of informatics.
- 2. Conceptual Knowledge Objectives. Understand, apply, analyze and evaluate:
  - a. The key models for healthcare improvement, including the IHI Triple Aim and the IOM Six Aims and the clinical informatics implications of each.
  - b. The various perspectives and activities that informaticians have and undertake, from basic research to application.
  - c. The way in which clinical informatics intersects with the other three UW domains - bioinformatics, public health informatics and consumer informatics.
- 3. **Procedural Knowledge Objectives**. Apply, analyze and evaluate your skills and abilities in:
  - a. Information seeking.
  - b. Communication.
  - c. Teamwork and peer feedback.
  - d. Peer teaching and learning.
- 4. *Metacognitive Knowledge Objectives*. *Apply, evaluate and create:* 
  - a. Your desired approach to life-long learning towards career development.

"Our recovery plan will invest in electronic health records and new technology that will reduce errors, bring down costs, ensure privacy, and save lives."

President Barack Obama Address to Joint Session of Congress February 24th, 2009



### HOW WE'LL GET THERE

BIME, in my experience, is a program in which each student cohort brings diverse prior training, experience, and skills to the classroom. Here's what I recommend: forget most everything you remember from courses you've been in before.

There's a good chance this course will vary from graduate school courses you've completed in the past. For one, while I might be listed as the "instructor" I am actually much more a fellow learner. My job is not to actively deliver knowledge to you, the passive learner. I will ask you to take ownership of your learning and codesign (with me and your peers) what - and how - you will learn. From experience I can predict that for many of you this will be a tad disorienting, confusing and seemingly unstructured. So all I'll ask at the outset is for you to have a bit of patience. It will, I think, make sense, eventually...

Now permit me to get educationally geeky for a moment. Current andragogical theory suggests that the most authentic and effective learning environment is one in which the learning tasks:

- are realistically contextualized: they simulate real-world settings both applied and academic;
- require judgment and innovation: they are more than just testing for a discrete piece of knowledge you glean from a textbook or lecture. They ask you to both challenge what you read and hear and they ask you to self-assess how to best tackle the task;
- require you to "do" the subject; they enable you to carry out the exploration and work of the discipline - in our case, clinical informaticians:
- replicate the common and challenging situations in the workplace and personal life: they enable you to perform in the complex and "messy" contexts of real-life;
- · assess your ability to efficiently and effectively use a repertoire of



**"Paper records and** prescriptions kill. Mistakes made by depending on [and using] paper keep happening; the thing is, they're avoidable. Everyday that we don't act, people will continue to die unnecessarily."

Newt Ginarich. **Remarks at the Frontiers of** Healthcare Conference, **Brown University** June 22, 2004

knowledge and skill to negotiate a complex and multistage task: they ask you to develop and use a broad range of knowledge and skills in learning;

allow appropriate opportunities to rehearse, practice, consult resources and get feedback on and refine performances and goes according to plan!) fulfill them. products: they give you the

opportunity to move through a cycle of "perform-feedback-reviseperform".

I've endeavored to designed this course to embrace these concepts. Our class sessions and the tasks/ deliverables you'll carry out will (if all

COURSE AGENDA				
MODULE	ТОРІС			
1	How Did We Get Into This Mess?			
2	A Better Way			
3	Clinical Informatics Interventions 1: The EHR			
4	Clinical Informatics Interventions 2: CPOE and CDSS			
5	Clinical Informatics Interventions 3: HIE			
6	Clinical Informatics Interventions 4. Telehealth			
7	Clinical Informatics Interventions 5. Analytics			
8	Clinical Informatics Interventions 7: Population Health Management			
9	Clinical Informatics Interventions 8: Recurring Challenges			
10	Esemplasy			

BIME 535 - Clinical Care and Informatics



#### Deliverables

You - and your team - will have four distinct but interrelated learning tasks in our course:

- Creation of a personal learning plan.
- Creation and curation of a team "Clinical Informatics Primer for BIME Students".
- Creation and curation of individual reflective essays as a part of the Primer.
- Giving and receiving peer and team feedback.

If you've been paying attention, you'll recall that on the last page I mentioned that you, your peers and I will "codesign" how we (individually and collectively) approach this course. Given that each of you has a distinctive background, informatics interests, career trajectory, and preferred learning approach, we will spend the entire first class session working through the details of these deliverables, giving you the opportunity to revise them such that they will best fit your - and my - goals. So consider the following details as a "first draft"... "For the wealthiest country in the world... to not have figured out access to basic healthcare as a fundamental right for individuals, I think is a little bit of a national embarrassment."

John Jay Shannon, MD, CEO of Cook County Health & Hospitals System Chicago

#### Personal Learning Plan

I think it likely that each of you has a specific set of goals for this course. For example, those of you who are pursuing a clinical informatics career direction will likely need to take a deep dive in this course. For those pursuing a bioinformatics direction, your goal may simply be to learn enough to pass the quals exam (if you are on the PhD track). Similarly, the Masters students and the PhD students - regardless of which informatics "flavor" they may be - likely have different needs in the knowledge and skills they develop in this course. Given these differences, I would like each of you to create your "personal learning plan" for the course. Appendix A of this syllabus contains a draft learning plan.

#### Clinical Informatics Primer for BIME Students

Our course will play out in roughly ten modules, each a week in length, starting on Wednesdays and ending the following Tuesdays. The general flow will be:

- 1. Tuesday at the end of class I assign a "common reading or resource" that we all digest over the next two days.
- 2. In class Thursday we discuss and make sense out of the reading as well as undertake one or more related exercises, and by the end of the class session we'll have identified a set of "Essential Questions" that encompass what is important for informaticians to better understand and (at least begin to) answer in relation to the topic of that week's module.
- 3. Between class on Thursday and the following Tuesday you and will team will do what you need to develop your answers these essential questions and post them to your team Primer. The basic goal of this primer is to define "what the BIME graduate student needs to know/do/value about clinical informatics."
- 4. In class on Tuesday each team will briefly present their core points from the primer, and we'll all discuss what we've learned.
- 5. Rinse. Repeat.



"We must look at the goal of a unified health system and agree that IT investments and healthcare quality are inextricably linked. This is not a government issue or a technology issue or a healthcare issue, at least not solely. It is a leadership issue."

Herbert Pardes, President & CEO of New York-Presbyterian Hospital and President of the eHealth Initiative. September 6, 2004

How your team chooses to tackle this weekly effort is up you creates individually and in which you reflect on the to you. Likely it is a good idea to define a team leader and as well to develop a team approach to each week's research and authoring requirements. The format for the primer is up to you - a basic text document, a set of web pages, multimedia - whatever you feel would be the best design to accomplish the goal. As far as "length", I'd rather not be the one to mandate "x number of pages". Rather, I propose that each week's contribution is rigorous, but also recognizes that this is but one course that should occupy about six hours of your time each week out of class. And you have less than a week to complete each entry. As well, I'd like folks in the other teams to review your team's primer contribution each week, so conciseness and clarity are a plus.

You might also consider the audience for these resources. Again, your team can decide for whom you are writing. One thing I do want you to avoid is considering me as the audience. Rather, I might propose you think of your fellow classmates as the audience. Or, next year's BIME cohort as the audience. I also want you to avoid simply writing a "book report" in which you summarize the content you uncover. What we's like to hear is YOUR voice. What does the topic mean to you? What are your opinions, experiences, perspectives? Ideally your team will find some level of consensus on these things each week - but it is not required or - even expected - that you will all agree completely (just like real life). Individuals on your team can certainly, if the wish, add a "dissenting opinion" to the primer.

I will require that each week's primer contribution have two components. The first is the team component, as I've described above. The second is what we might call a "personal reflective essay" - a shorter entry that each of

week's learning events and activities. In your journey through graduate school you write. A lot. For the most part this is academic writing - research papers, critical analysis papers, and the like. All of which are important skills to develop, of course. Writing a personal learning log is different. As noted in the learning objectives a core outcome for this course is to enable you to become a better self-directed learner. And creating a weekly reflective essay is one evidence-based approach to achieving this. Appendix B contains more detail on how to get started with reflective writing.

#### Course Norms

Given that this learning environment is likely a new and unfamiliar one for many of us, I'd like to propose these course norms:

My expectations of you:

- · An acknowledgment that your fellow learners are diverse in their prior education, experience and knowledge. Think of them not as competitors, but as colleagues. I guarantee you'll will learn as much from them as from me.
- · A commitment to rigor I'll push each of you to excel, based on your interests and experiences. At times this may make you feel a bit uncomfortable, but it should never make you feel unsafe.
- · To see me as a mentor, advisor, consultant, and colleague - a fellow learner. Not as the font of all knowledge.
- · A willingness to reset your expectations as to my responsibility as the instructor. It isn't to tell you all you need to learn - it is instead to assist you in selfassessing what you need to learn - and helping you get there.

- A perspective in that everything you do in this class should be done with two goals in mind. First, to enable you to become a better life-long learner, and second to enable your classmates to become better life-long learners.
- Most importantly, that you be willing to take ownership of your learning rather than depend on me, your colleagues or the program to deliver it to you.

#### What you can expect from me:

- A stimulating learning environment that creates intellectual curiosity.
- "Just enough" structure yet plenty of support. This may mean that at times the problems and challenges we explore feel ambiguous, complex and with "no right answers" - just like the real world.
- A learning environment that facilitates interaction and collaboration between all of us in the course.
- Serving as your cognitive coach as well as content coach. This means I will spend equal time discussing what we know and how we come to know it.
- Full willingness on my part to have you let me know if and when I am not meeting these! And if you have additional expectations. I'll do my best to adapt myself and our course to what works for you.

#### What we can expect from each other:

- Ask for help when you need it. Reach out and help your peers when you see the need.
- Keep an open mind. If you're feeling reluctant, that's ok. Take it one step at a time and look at this as an opportunity to learn something new.
- Contribute regularly to collaborative activities to ensure other members of our community have ample opportunity to read/listen, reflect, and respond to your ideas.
- Respect the diverse opinions and viewpoints of each member of our community. Differences allow us to learn and grow together.

#### A few final thoughts on professionalism:

Have a bit of patience - and a sense of humor - with technology. There will be hiccups, expect them.

• When we meet face to face in class, technology (computers, tablets and phones) are welcome - as long as they are used to support our session efforts. We can all live without email and Facebook for a few hours. There is no such thing as multitasking (I have data to support this if you'd like to see it... :-)

A word about due dates. In some courses the standard is to set due dates for deliverables and to state penalties (e.g., x points docked from the possible score) for missed due dates. My belief is that this approach is not so useful in executive education. For one, adult learners have jobs and families and, well, "a life" (hopefully!) that invariably come into play during the quarter. Second, I believe that adult learners respond more to professionalism as a motivator than they do to point totals or grades. Given this, the due dates I set are "soft" - you won't be punished for a 5:00 pm deliverable that you post at 5:01 PM. But I - and your colleagues - expect that you will complete your tasks in a "timely" manner. The course moves quickly, so I'll ask that you keep this in mind.

### HOW WE'LL ASSESS

Here's the problem with traditional grading. It fails (no pun intended) to support the effective learning environment criteria we laid out above. A setting where I am the sole judge of the quality value of your work creates incentives such that you try to discern what I want to hear. Given this, I want us to work collaboratively on grading. And to give you considerably more control in the process.

Here's how it works. The UW Graduate School standards are that, to remain in good academic standing, you must maintain a GPA of 3.0 and at least a 2.7 in each class you take. So even a 2.7 means that you have successfully fulfilled the requirements for the course and you need not repeat it. In my experience, graduate students tend to feel that any grade other than a 4.0 is somehow a "failure".

That's not the case. Given these comments, my first request is that you focus a little less on "How do I get an A?" and a little more on "How do I best use my time to get

"Interoperability must be addressed now, or else widespread adoption of stand-alone EHRs will be a fait accomplish."

David Brailer, MD, PhD, National Coordinator for Health Information Technology, 2005



the most out of this course?"

To nudge you in that direction, we'll use a form of "specifications" grading in our course. It is based on a grading standard we use over in the School of Public Health, which is outlined in the table below. In short, if you complete all the learning tasks throughout the quarter and you do them diligently and with integrity, for me that demonstrates "competent and sound" work. Hence, a final grade of 3.5. With this model, your final grade for the course does not derive primarily from my judgment about the quality of your work. This doesn't mean I don't care about the quality of your work - far from it (more on this in a moment). Rather, it means that we decouple my quality evaluations from the assignment of a grade. With this approach you know at the outset of the course what you have to do for a 3.5. Which is simply to:

- create a realistic and meaningful personal learning plan, and follow it,
- participate and contribute effectively and equally to your team's work each week,
- put in a good faith effort on your personal reflective essay each week,
- engage and participate in our classroom sessions,
- stay current each week, meeting each week's due dates.

Some of these, as you can see, are clear - such as due dates. Others are a little less clear and more subjective.

For example, criteria such as "participate and contribute effectively and equally "and "good faith effort" can be harder to measure.

This is where the quality of your work comes in. I will do my best to provide you with regular feedback on each of these items. Not in the form of a grade - rather as observations and advice as to how you might craft these to improve the value to you and your peers. To guide this, we'll use several rubrics to better define what we're striving to achieve. For example, Appendix C includes two rubrics - one on team performance and one on selfassessment of learning. Additional rubrics are on the course Canvas page.

You and I will also meet one-on-one in mid-quarter to see where you are on your learning plan and for me to offer feedback and advice on how I perceive your work in the course so far, with the goal of continuous improvement. If I feel your effort and contributions have not met the "competent and sound" standard, we'll talk about how to improve. And if I feel your effort and contributions are reaching the "strong" to "excellent and exceptional levels, we'll also talk about it - and I'll reserve the right to give you those respective grades for the course.

Grade	Interpretive Statement
4	<b>Excellent and exceptional</b> work for a graduate student. Work at this level is unusually thorough, well-reasoned, methodologically sophisticated, and well-written. Work is of good professional quality, shows an incisive understanding of health services-related issues and demonstrates clear recognition of appropriate analytical approaches to address health problems and questions.
3.7	<b>Strong</b> work for a graduate student. Work at this level shows some signs of creativity, is thorough and well-reasoned, indicates strong understanding of appropriate methodological or analytical approaches, and demonstrates clear recognition and good understanding of salient health services-related issues and problems.
3.5	<b>Competent and sound</b> work for a graduate student; well-reasoned and thorough, methodologically sound, but not especially creative or insightful or technically sophisticated; shows adequate understanding of health services-related issues and problems, although that understanding may be somewhat incomplete. This is the graduate student grade that indicates neither unusual strength or exceptional weakness.
3.3	Adequate work for a graduate student even though some weaknesses are evident. Moderately thorough and well- reasoned, but some indication that understanding of the important issues is less than complete and perhaps inadequate in other respects as well. Methodological or analytical approaches used are generally adequate but have one or more weaknesses or limitations.
3	<b>Borderline</b> work for a graduate student; barely meets the minimal expectations for a graduate student in the course; understanding of salient issues is incomplete, methodological or analytical work performed in the course is minimally adequate. Overall performance, if consistent in graduate courses, would barely suffice to sustain graduate status in "good standing."
2.7	<b>Deficient</b> work for a graduate student; does not meet the minimal expectations for a graduate student in the course. Work is inadequately developed or flawed by numerous errors and misunderstanding of important issues. Methodological or analytical work performed is weak and fails to demonstrate knowledge or technical competence expected of graduate students.

### BIME 535 - Clinical Care and Informatics

### ADMINSTRIVIA

There are three textbooks we will use - all available on line through the UW Health Sciences Library.

- "<u>Understanding Health Policy: A Clinical Approach</u>." 7th Edition; Bodenheimer and Grumbach; McGraw-Hill Medical; 2016.
- "Biomedical Informatics: Computer Applications in Health Care and Biomedicine." 4th Edition; Shortliffe and Cimino; Springer; 2014,
- "Health Care Information Systems A Practical Approach for Health Care Management." 3rd Edition; Wager, Lee, and Glaser; 2013

#### Academic Integrity

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The UW School of Medicine is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120) I expect you to know and follow the university's policies on cheating and plagiarism. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. For more information, see the University of Washington Community Standards and Student Conduct website.

#### Access and Accommodation

Your experience in this class is important to me. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or <u>uwdrs@uw.edu</u> or <u>disability.uw.edu</u>. DRS offers resources and coordinates



reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

#### Diversity, Equity and Inclusion

Diverse backgrounds, embodiments, and experiences are essential to the critical thinking endeavor at the heart of university education. I seek to ensure all students are fully included in each course and I strive to create an environment that reflects community and mutual caring, while we ally with others in combating all forms of social oppression, including those based on age, cultural background, disability, ethnicity, family status, gender identity and presentation, citizenship and immigration status, national origin, race, religious and political beliefs, sex, sexual orientation, socioeconomic status, and veteran status. We all have the privilege of learning together and as such we have the responsibility to engage in dialogue in a way that supports learning for all of us. Here are some practices we as community members can strive to use in our learning process:

- My own viewpoint is important-share it. It will enrich others.
- My colleagues' viewpoints are important—listen to them. Do not judge them.
- Extend the same listening respect to others I would wish them to extend to me. We all have room to grow to become better listeners in non-judgmental ways.
- Recognize that I might miss things others see and see things others might miss.
- Raise my views in such a way that I encourage others to raise theirs.
- Inquire into others' views while inviting them to inquire into mine.
- · Ask questions when I don't understand something.
- Surface my feelings in such a way that we make it easier for others to surface theirs.
- Challenge what was said or done, rather than make assumptions about the individual.
- Be willing to take risks in moving outside my comfort zones.

"We must look at the goal of a unified health system and agree that IT investments and healthcare quality are inextricably linked. This is not a government issue or a technology issue or a healthcare issue, at least not solely. It is a leadership issue."

Herbert Pardes, President & CEO of New York-Presbyterian Hospital and President of the eHealth Initiative, September 6, 2004

# Appendix A: Personal Learning Plan

#### BASELINE

Describe your existing knowledge, skills, values, and experience in clinical informatics.

<type here>

#### CAREER TRAJECTORY

Where do you feel you may choose to go as you complete the BIME degree?

<type here>

#### COMPETENCIES (3-5)

After reviewing the AMIA and NCHL documents, which competencies are those most important to you?

1.

2. 3.

#### **LEARNING OBJECTIVES (3-5)**

Given what your baseline and career trajectory, where you will focus your clinical informatics learning this quarter?

1.

2.

3.

#### **RESOURCES AND STRATEGIES (3-5)**

Describe the activities you will undertake (reading, research, site visits, interviews) to achieve these objectives.

1.

2. 3.

#### **EVIDENCE/METACOGNITION**

Describe how you will know that you have achieved these objectives?

#### FOLLOW-UP

How would you like me to aide and abet you in fulfilling this plan?

This quarter, my goal is to teach you absolutely nothing.

If I do my job as well as possible, then I will not teach one single fact or concept. It is likely that 25% (maybe more?) of what I know is wrong anyway. So my job is not to teach you what to I know but rather to explore with you how we can best think through the complex and difficult challenges in healthcare. This is the sort of learning that prepares you for your profession as an informatician, the sort that enables you to become a self-directed, life-long learner. So if I do my job well, I'll be less of a teacher and more of a guide, facilitator, coach (and a devil's advocate, provocateur, and all around bon vivant). I'll work with you in an environment in which you decide how to best uncover the requisite information, knowledge and skills. Frankly, you only really learn something if you discover it on your own. So, our course is designed so that you sort through and find information provided to you, to answer questions, and to go through experiences that enable you to make your own inferences and figure out your own world view.

For me, the essence of becoming a self-directed, life-long learner is "metacognition." Thinking about your own thinking. It's not just "What did I learn this week?" - it's also "How did I go about learning what I learned this week? What worked and what didn't?" This of it this way - if you wander through a maze without paying attention to your route, you may eventually get out, but it will be inefficient and probably unpleasant. However, if you actively think about being aware that you are in a maze, and you focus on the methods that you are using to get out of the maze, then you will not only get out of the maze more quickly but the process of solving the puzzle might be more fun as well. More importantly, you also learn something about your own problem solving skills that will invariably equip you to better tackle the next challenge that comes along (and believe me, in your field there will by plenty!)

Our course is like a maze - one that I have designed. Granted, it's one of many possible mazes, but it's the one we'll use. I could show you a map of the maze, but then you would be deprived the opportunity of truly learning the maze by building the map yourself. In the process, you may very well decide that you can build a better maze.

You might have some classes in this program in which you feel the urge to write down notes from the powerpoint lecture. That won't be happening here. We'll be using our time together to interact and learn from one another and engage substantially with both the content and with each other. This is not because I don't like to lecture - I do, I really do - but rather because the science of learning is unambiguously clear on this fact: we learn better when



interacting and learning in groups. Learning solitarily is lot more difficult, and learning by digesting notes from a lecture is inefficient. This may be different from the bulk of your classes, but I ask that you put some trust in me and that when we reach the end of the term you'll find the path we followed - while circuitous and seemingly random - was effective.

The measuring stick of how well I teach is not about my performance as a theater exercise, but how well you learn. I'm not talking about how well you might do on an exam at the end of the course (if we were to have one). I'm talking about what you know about this topic ten years from now and even more, how you keep learning about this topic throughout the rest of your life.

I refuse to barrage you with information that you will soon forget, and instead I'm choosing for us to learn a small number of concepts and ideas, chosen carefully, that will stick with you well after this course is over.

I'm sorry to lecturing to you for so long about this. Hopefully, if I do my job well, I won't do this much speaking again throughout the whole quarter. All this may sound strange to you. I'll simply ask that you give it a try.

(Thanks to Terry from <u>Small Pond Science</u> for the ideas above...)

#### "So, Dave, just what is metacognition?"

The most meaningful learning has two critical facets uncertain or unique. He reflects on the phenomenon (probably there are many more, but two is about all I can handle). The first of these "lenses" is the one we all know well - the "content". The core knowledge and skills and values central to our domain of Informatics. To put it phenomenon and a change in the situation." simply, "it's what's in the book."

The second lens is equally, if not significantly, more important. It is simultaneously learning the content and "learning how to learn". This is called metacognition - a term you may well be sick of by the end of the course. Nonetheless, it's a central goal for our course.

Think of it this way - learning is a cognitive experience. As you go through a cognitive experience, it is useful to be mindful of the fact that you are having a cognitive experience. For example, as you analyze a current health services challenge and develop your ideas for a creative solution, you might do well to also reflect on the specific process you have used to get there. In short, both being able to say, "Here is my solution" and "Here is what worked (and what didn't) in my process of developing this solution."

In our course we'll certainly work on better understanding the U.S. healthcare system and the role clinical informatics can play. And we'll also work on better understanding of how to become an effective life-long learner. Developing metacognitive skills is certainly not an easy task! And I can safely predict that many of you will find the construct opaque and confusing - I know I still struggle with it. So for now, keep calm and carry on...

#### Reflective Thinking, Reflective Writing

Donald Schon describes "the reflective practitioner" in this way - differentiating two types of reflection:



"The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds before him, and on the prior understandings which have been implicit in his behaviour. He carries out an experiment which serves to generate both a new understanding of the

Schon calls this "reflection-in-action" - "thinking on one's feet" so to speak, while you are working to solve the problem. Reflection-in-action is then followed by "reflection-on-action":

"This is done later – after the encounter. Workers may write up recordings, talk things through with a supervisor and so on. The act of reflecting-on-action enables us to spend time exploring why we acted as we did, what was happening in a group and so on. In so doing we develop sets of questions and ideas about our activities and practice."

What this means is that the reflective practitioner not only works to solve the problem, she also works to learn how she solved the problem - or, if she failed, how she failed. She actively works to better understand more about how she learns.

The central goal of the the weekly personal reflections in your team's primer is to enable you to develop your metacognition through reflective thinking and writing.

> "The unexamined life is not worth living." Socrates

#### "I don't do journaling" Terry, a graduate student

Reflective thinking and writing are hard. Many of us grew up in a school environment in which this process, which you may know as journaling, is considered at best a nicety, and at worst non-academic and a waste of time. You'll have to decide for yourself. I'll just say this - there is pretty solid research evidence (happy to provide it to you - just ask) on the value of reflective writing and journaling for health professionals. For instance, it's been shown to enable one to:

- · Become a better writer and clearer thinker.
- · Develop a deeper understanding of personal beliefs and insights.
- · Improve in problem identification and problem solving ability.
- · Develop a professional identity.
- · Develop empathy.
- · Reduce stress and improve health.

Rather good reasons to give it a go, I think. And remember, you can quit after ten weeks if you wish.

"Yes, Dave, but what EXACTLY do I write?!"

I get this question every year. Fair enough. Problem is, I can't really tell you. It's YOUR reflection, not mine. But I can give you some ideas to consider.

First of all, bear in mind that this sort of writing is distinctly NOT academic writing as you've done in many courses before. It's not an effort to summarize or restate the concepts and ideas in the content - it's not a "book report". Rather, it is about making personal meaning of the concepts and ideas we explore, how they relate (or don't) to you, your current and future roles in public health, your personal values. Reflective writing is therefore neither right nor wrong. Each writer may, and likely will have a different reaction to the content.

Second, it is distinctly not the academic writing style. It's informal. Grammar and spelling are not important. Overall organization takes a backseat to ideas. Above all, it is unedited - the goal here is NOT a perfect document - it is capturing your thinking and reflection as it happens. It shouldn't take you hours to complete. I'd suggest that if you are taking more than 30 minutes each week it's time to step back and rethink how you are approaching the task. (I will note that I have seen some students actually spend hours on the task because they have found it so useful. Great when it happens, but certainly not mandatory.) All this "freedom" from academic constraints doesn't necessarily make it easy to write in this form. To get the most out of the exercise you have to be willing to take risks, to voice your confusions, to explore undeveloped ideas or projects. To give yourself the space to develop your own voice - one that may initially scare or embarrass you.

Third, and also contrary to much academic writing, your primary audience for reflective writing is not me (the instructor). It is first and foremost you, the learner. This is important, so I'll repeat it. If you are not benefiting from the writing you do in this course then we're doing it wrong and we're wasting each other's time. So it's critically important that you go into this learning task with the mindset of doing it for yourself, not for me. So after a few entries, if you find you do not perceive any real value for yourself, give me a shout - and we'll try to sort that out.

Fourth, remember that I am NOT grading these. Grading them defeats the purpose of reflective writing. I will, however, let you know if I feel an entry is insightful, creative or otherwise valuable - mostly because I may ask your permission to share it with the rest of the class. I will also let you know if I feel your entries are somehow missing the



mark and we can see what we can do to get on the right track.

Here are some general ideas and prompts that may help:

- A reflection can allow you demonstrate your individual participation and personal engagement with the class and the "essential questions" we raise. It is an opportunity for you to "think with yourself" and discuss personal reactions and questions.
- A reflection can allow you to connect these essential questions to your own experience, both personal and professional.
- In reflection you can examine any problems you encounter as you learn and research these essential questions.

One of these prompts might start you off:

- What do I wish we had covered more completely?
- What one important concept, research finding, theory, or idea most impacted me this week? Why?
- How might what I learned this week have an impact on my professional life?
- How does this topic relate to my own life experiences, personal and professional?
- How does my own previous experience add to this topic?
- Why do I care (or not) about this topic?
- Why should others care about it?
- What do I feel my peers should understand about the concepts?
- What prior knowledge did I bring to this topic? How about prior opinion? Prior bias?
- Did the readings or discussion over the course of the week cause me to modify my previous knowledge? Opinion? Bias?
- Do I have disagreements with any of the assertions made by Dave? My fellow students? The author(s) of any of the works I've read?
- What areas do I plan to investigate further to enhance my professional expertise? How will I go about this?



- In what specific ways might I put the ideas and concepts we've explored to use in my current role or professional development?
- What best helped me learn or develop this week?
- What resources are available to help me learn more?
- What do I need to do to get more information on this topic?
- Whom do I talk to? Are there experts that I can talk to about it?
- I now know that..." (new knowledge)
- I now know how to..." (new skill)
- I now feel/believe that..." (new value/metacognition)

If you're still struggling to get started...

#### "Writing is thinking."

Reflective writing is not designed to capture the thoughts after you've organize them in your mind. Rather, it is writing that works as a "sketchpad" for thoughts, insights, quotations from references, and background knowledge sources. It's not about coming up with a polished final product the first time your fingers hit the keyboard or grasp the pen. It's about working through, grappling, pulling apart, analyzing, summarizing, and finally finding an authentic and personal idea or insight. You don't create drafts. You don't edit. You don't create an outline. You simply write while you think, as you think it.

"Free-writing" is perhaps the best (but not easiest) way to get started. The directions for a free-write are simple:

"Sit down with pen and paper. Pick up the pen and write. As soon as the pen hits the page, write, for at least ten minutes. Don't stop for anything. Go quickly without rushing. Never stop to look back, to cross something out, to wonder how to spell something, to wonder what word or thought to use, or to think about what you are doing. If you can't think of a word or a spelling, just use a squiggle or else write, 'I can't think what to say, I can't think what to say' as many times as you want; or repeat the last word you wrote over and over again; or anything else. The only requirement is that you never stop. Suspend your disbelief - just follow the directions and see what happens."

The research shows that free writing contributes to three positive outcomes – idea generation, developing your voice, and becoming more fluent. Free writing produces bits of writing that are genuinely better than usual: less random, more coherent, more highly organized. Fluency comes from completely avoiding editing while you generate ideas in their raw undeveloped form.

What might this look like? Here's an example from a graduate student:

"I am so tired. I didn't go to bed last night because I still hadn't finished either of my two big important portions of my paper – the methods (which I know I wrote poorly) and the literature review. I rode my bike to the corner of Conestoga and Main to catch the bus. And boarded the 62 instead of the 92! I need to take up a new adage, "Look twice, board once!"

The power of free writing lies in putting words, any words, on the page without criticism. Fresh, original ideas are often hard to find; yet pre-writing, with its lack of constraints, encourages, supports, and even cheers the production of words in whatever form. Directed and sustained practice in writing like this builds fluency and motivation. The first ones will be a challenge - you'll feel they are imperfect, that they're stupid, that their empty. That's okay. You may find, as you continue practicing, that you uncover strong feelings you didn't know were there. You may recognize some connections between ideas that you didn't appreciate before. You may be surprised by some of these discoveries and this will encourage you to continue your exploration and clarification of thinking through this writing. You may have a true "Aha!" moment. Perhaps several. "Oh! So that's what was on my mind! I never thought of that before! Maybe I DO I already know something about this topic!"

Here's the key. Free-writing "invites surprise". When we free-write we often discover things we didn't know we thought or felt. The deepest insights often come after ten or fifteen minutes when we initially feel we've run out of things to say.. "If you don't get a surprise in your writing you wouldn't keep writing. You have to put aside your belief that nothing will come of this."

Meta-reflection, or Reflecting on Reflecting. An important part of this practice is that you actually take the time to go back to previous entries and take a sort of "balcony view"

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of yourself as a learner. When you go back and reread your entries, you may well be able to see what you've learned, highlight successful learning strategies, and better understand dead ends. This is all about monitoring your learning process you'll actually see how your thinking has changed over time. Of course, the initial reaction is painful – it's very likely you'll feel that everything you've written before is so exceedingly stupid. Remember, only you and I see it. And I'm not judging you. Also, remember that once you write any particular entry, you can never write that same entry again. This means that, even in the short term, you've changed.

Here are a few more prompts that might help:

- What is it about this entry that caught my attention, what does that tell me about myself now?
- How does this entry help me understand and integrate the course themes in my professional life?
- What are some of the underlying assumptions, beliefs or biases I may have had (or still have) about this topic? Do I still agree with them?
- Looking back on this entry, in what ways has my thinking changed since I wrote it?
- What next steps are future ideas might come out of reflecting on this entry and its implications?

• In what ways has keeping a journal for this class change my thinking beliefs about writing and/or the value of keeping a journal in my professional life? How does this journal entry reflect those changes in my beliefs?

Finally, a reflection from a previous student:

"I have stuck my foot in the door of the wonderful world of journaling as reflective practice. I now feel equipped to go beyond logging and recording the events of my life but to look deeper and learn from experiences. I plan to take more risks and leave any concerns of an imagined audience behind. My journal is a safe place for me to explore my thoughts, feelings, and concerns. It is a place to practice being me without criticism. It is no longer a place to chronicle events that happened to me but a place for me to happen, for me to grow into a complex, thinking adult who can make decisions for myself, by myself."

Parts of this appendix are adapted from <u>"Journal Keeping:</u> <u>How to Use Reflective Writing for Learning, Teaching,</u> <u>Professional Insight and Positive Change</u>" by Dannelle Stevens and Joanne Cooper.

"Don't believe everything you think." Anon



# **Appendix C: Assessment Rubrics**

The rubric below is an example of self-assessment. The rubric on the following page is an example of team assessment.

SELF ASSESSMENT RUBRIC					
How often do I?	NEVER/RARELY	SOMETIMES	GENERALLY/ FREQUENTLY		
Connect the content to my personal or professional experiences.					
Distinguish relevant from irrelevant facts.					
Evaluate arguments, interpretations and beliefs.					
Consider the credibility of sources.					
Raise and pursue root questions.					
Consider a wide variety of points of view.					
Come to terms with contradictions and inconsistencies.					
Use my own thinking to analyze and conclude.					
Generate novel ideas.					
Question or accept other's views.					
Defend my positions and values.					
Examine assumptions (mine and other's).					
Explore implications and consequences.					
Synthesize concepts or theories across topics.					
Set goals for future learning and development.					
Propose ways to improve my learning.					
Comments					
What I'm going to do differently going forward					

# **Appendix C: Assessment Rubrics**

TEAM RUBRIC							
TEAM EFFECTIVENESS	CHALLENGED	ADEQUATE	EXEMPLARY				
1. Roles and responsibilities	Roles were not defined or were meaningless; individuals did not own their roles; performance in roles was ineffective	Roles used, but only major ones (e.g., leader, recorder); all members accepted a role, but fulfilled assigned role only minimally	Functional roles assigned and revised over time; team members performed multiple roles during project; all members accepted, assessed, and improved roles over time; roles performed skillfully; team members helped with other roles				
2. Attitude and climate	Complacent energy level; disrespectful attitude common; conflicts were destructive to team performance	Energy level generally upbeat; polite acceptance of the views and ideas of others; conflicts defused	Energy level inspiring and motivating for productivity; team members encouraged and built the strengths of others; conflicts were resolved effectively and were used to develop team understanding and growth				
3. Resource management	Personnel were used only passively; schedule was poorly defined; other resources were poorly used	All members contributed to a similar extent; each team member's strength was used; project milestones were set and generally monitored; available resources were used	All team members contributed extensively; team member's skills were assessed and strengths developed and used; both project and member milestones were set, monitored, and revised; necessary resources were identified, accessed, developed, and used creative				
4. Operating procedures	Very low expectations; operating procedures were either nonexistent or ineffective	Procedures were general and only verbalized; procedures were often but not always followed; procedures clarified expectations and aided interdependence	Procedures were written (rather than oral), revised as needed, and supported by all; procedures were followed regularly; use of the procedures built relationships and led to team synergy				
5. Synergy	Team was a collection of individuals that merely divided the work to be done	Moderate synergy attained, either at low level or sporadically; the team realized some benefit from working together beyond simple division of labor	High degree of synergy attained; team members developed skills and ideas through interactions with others; final design could not have been achieved by dividing project and working individually				
MEMBER EFFECTIVENESS	CHALLENGED	ADEQUATE	EXEMPLARY				
1. Preparation.	Reads material during exercise or has not read material; is not prepared to help the team's learning process.	Reads material and prepares written answers to questions.	Brings in extra material in order to enrich the learning environment and is prepared to help the team's learning process.				
2. Contributes to Discussion.	Occasionally makes a comment related to the topic being discussed or does not make any contribution during team meetings.	Is able to answer other's questions and relates material to own experience during team meetings.	Explains material to others and provides new insights in order to promote interpersonal involvement during team meetings.				
3. Attends Team Meetings.	Frequently misses class and team meetings, ≥5 times a semester	Occasionally misses class and team meetings, only 3-4 times a semester.	During class and team meetings, is always present or rarely misses, only 1-2 times a semester.				
4. Creates a Positive Learning Environment.	Does not contribute in a positive manner and sometimes, may focus on negative things.	Is mostly supportive of other's contributions in an effort to promote a positive team culture. On occasion, may be neutral in affective contribution to the team.	Interaction with team members is positive; keeps team sessions light to develop a positive team culture.				
5. Communicates Effectively.	Comments are sometimes vague and has trouble getting a point across; comments may be negative in tone or sometimes argumentative.	Is usually an effective communicator; gives feedback that is often helpful.	Comments are almost always positive, easily understood; when giving constructive criticism, feedback is timely, specific, and behaviorally focused.				