Teaching Portfolio

Kate Lockwood

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Teaching Statement

I feel strongly that students need to feel like computer science is an accessible and useful discipline. To that end I develop assignments that are tied to current events or to student interest. I encourage students to come up with their own ideas for course projects and to think of ways to tie their CS work to projects in other courses. In addition, being able to explain clearly the methods used on a project and to describe its relevance are nearly as important as syntactic issues in my grading methods. This encourages students to think about the problem solving process involved in programming instead of focusing on syntactic details. These philosophies manifest themselves in several course goals that I strive to maintain:

1) As much as possible, I try to limit the amount of straight, uninterrupted lecturing that I do. In introductory courses, my personal preference is for class to be taught in a room where students have access to computers. Lecture can be interspersed with hands-on activities to keep students engaged and interested. For other classes I try to pepper lectures with short in-class assignments and activities to keep students engaged with the material.

2) I give students many opportunities to provide feedback on how the course is going and which topics they have questions on. I feel that students are more invested in a class if they feel like their feedback and participation is valued. I incorporate several different types of student feedback. I have had a small group analysis of a course conducted by an on-campus teaching group. I also periodically use quick (5 minute) ungraded quizzes or writing assignments to gauge which topics students need refresher lectures on. I try to address student questions and concerns and to provide explanations for course policies that they may disagree with.

3) I craft assignments that involve real-world situations and that appeal to many different disciplines. By creating assignments where students have "clients" in mind, I try to make homework appear more relevant to future job tasks and less like busy work. In most of my classes, I allow students to pick their own final project (with approval and guidance). This way students are allowed to tailor their work to something that actually interests them. They can see how computer science can work for them.

4) I incorporate "writing across the curriculum" activities whenever possible. Instead of just asking students to write a program, I will ask them to also explain their algorithm or design choices by writing a short paragraph. I also have them present their projects in class. This gives students the opportunity to try their hand at technical writing. It also makes them focus on the ideas and concepts they are learning and to develop communication skills.

Teaching Evidence

Syllabus for Freshman Seminar
I had the opportunity to co-design and teach a brand new course as part of the Teaching Certificate Program at Northwestern. The course was a writing-intensive freshman seminar; we chose science in the media as our topic.

Sample Lesson Plan – Freshman Seminar
For each day of class, as well as for the class as a whole, I try to make my learning objectives for the students very clear. So every lesson plan starts with the objectives for the day. I try to be as clear as possible and to frame objectives in terms of the specific skills I want my students to take away. This really helps me shape my lesson plans. This lesson plan also illustrates an example of how I work multiple activities into one class session as opposed to sticking to straight lecture all of the time.

Final Paper Assignment – Freshman Seminar
A major objective of the freshman seminar was to teach students to write at a college level. For the final paper assignment, my co-teacher and I tried to break the assignment down into manageable chunks. We also thought it was important to incorporate peer feedback into the writing process.

Sample Homework
I try to create programming homework assignments that test the necessary skills, but also leave room for students to be creative. I also try to make the assignment mirror a real world situation where there is a "client" that the students are doing the work for.

Sample Lab Assignment #1
As a TA, lab is the one chance that I get to watch the students work through the problem solving process right in front of me. I try to clearly lay out the goals and steps of the problem. In lab assignments I try to strike a balance between making the work challenging enough to engage the students and easy enough that the assignment can easily be completed in the time allowed (in this case lab was 50 minutes long).

Sample Lab Assignment #2
As a guest lecturer in somebody else's lab I was constrained by their format and assignment suggestions however I still tried to leave room for the students to be creative. In longer labs, I also like to have an additional problem for the students to work on if they finish early. Then every student is working for the entire class period and the students that are further behind don't feel as frustrated.

Sample Quiz
Quizzes are a great tool for students to judge their own progress and for me to judge where students are having difficulty in my class. In my experience students appreciate seeing the kinds of questions that they will be judged on in more high-stakes settings like exams. I try to keep quizzes very short 15-30 minutes so that an entire class period isn't

spent on them. Therefore, I reserve more reflect, free-response questions to homework and exams and uses quizzes as quick benchmark.

Sample Workshop Session

Running a workshop of peers is very different from teaching undergraduate students. In this case, my workshop partner and I were trying to get new TAs to brainstorm effect teaching practices.

Media Representations of Science
Syllabus – Winter 2007

This class meets: Monday and Wednesday 4pm-5:20pm
University Hall #218

Instructors:

Michele McDonough
m-mcdonough3@northwestern.edu
Office Hours: By Appointment

Kate Lockwood
kate@cs.northwestern.edu
Office Hours: Wednesdays
11:30-12:30 @ Norris
By Appointment

Objectives

By the end of this seminar you should be able to …
- … critically evaluate the scientific claims made in the media
- … explain the vetting of scientific information to others
- … plan, write, and edit a term paper including academic sources
- … collect and properly cite scholarly papers to support a written argument

Grading

30% Participation (in class and on Blackboard)
30% Small Assignments
40% Final paper (see assignment handout for breakdown)

Class Schedule

1. Each week is structured around a particular theme and an accompanying question(s).
2. Most weeks there will be one or two short assignments. Due dates/assignments will be announced in class and posted on Blackboard.
3. All reading is expected to be done by the beginning of class (4pm) on Monday and will be available on Blackboard

Week 1: What is science anyway?

Wednesday January 3
Question: *What is science? How do scientists "do" science? How do scientists evaluate other scientists work? How does the public perceive science?*

Week 2: Science in Popular Media

Monday January 8 and Wednesday January 10
Question: *How does the entertainment industry (television, movies, books, etc) represent science and scientists? How does the portrayal of science in the popular media color our perceptions of scientific advances? How do the media play on our (mis)conceptions of*

science/scientists when reporting?
Case Studies: Stem-cell research, cloning

Week 3: Statistics I

Monday January 15 and Wednesday January 17
No class on Monday for Martin Luther King holiday
Question: *What are important criteria for evaluating the statistical data supporting/refuting an argument?*
Case Studies: Cancer, global warming

Week 4: Statistics II

Monday January 22 and Wednesday January 24
Question: *continued from week 3*
Case Studies: EMF, others TBA

Week 5: Expertise & Reliability

Monday January 29 and Wednesday January 31
We will be meeting in the library on January 29th.
Question: *How do you evaluate the reliability of a source? How do you decide what qualifies someone as a scientific expert? How do you detect potential biases in expert reports?*
Case Studies: Alternative medicine, smoking, PR

Week 6: Expertise II + Fear of the Unknown

Monday February 5 and Wednesday February 7
Question: *How does the media fuel fear of unknown technology? How do consumers and the media react differently to the ideas "natural" and "chemical/man-made"?*
Case Studies: Vitamins/supplements, "killer" robots

Week 7: Public Panic

Monday February 12 and Wednesday February 14
Question: *How can you evaluate whether a reported risk is exaggerated or merits concern? What role does the media play in informing the public about potential risk?*
Case Studies: Avian Flu, SARS, BSE

Week 8: Policy and Science

Monday February 19 and Wednesday February 21
Question: *What are sources of potential bias and how can public perception and science policy be influenced?*
Case Studies: Global warming, genetic engineering, antibiotics, alternate fuels

Week 9: Technology in the Media

Monday February 26 and Wednesday February 28
Question: *How does new technology change how we get our (science) news? How do you evaluate an online source? How do you judge who is an expert online?*
Case Studies: Wikipedia, webMD

Week 10: TBA

Monday March 5 and Wednesday March 7 (last day of class)
Assignment: Final paper due by Wednesday, Marcy 7 at 4:00 pm

Late Policy

We will be giving you the deadlines for all work at the time that it is assigned. Part of this seminar will be learning how to structure your time and plan your work. Therefore, we will have a very strict policy on late assignments. Missing class does not excuse you from deadlines. You are responsible for checking Blackboard and checking with professors/other students to make sure you meet all deadlines.

Academic Integrity

We will be discussing proper source usage and citation in class. We expect everyone in the class to follow these rules and to do their own work at all times. Cases of plagiarism/cheating will be immediately referred to the Dean.

Week 2, Day 2 Lesson Plan (Wednesday January 10, 2007)
Science in the Popular Media II

Objectives
At the end of this class period, students should be able to:

- Recognize how stereotypes from the popular media play out in real news situations about scientific discoveries and controversies
- Differentiate between the current implications of scientific/technological advance and the future predictions.

Materials

- White board markers
- Either overheads or PPT slides (check to see if room has projector) – this is for the writing workshop at the end.
- Voting "cards" for writing workshop
- DVD

4:00 – 4:05 Introduction
Are there any questions from Monday? Any questions about the assignment?

Today we are going to talk about how the ideas we covered on Monday – popular conceptions about science and scientists – affect how science news is reported and how different groups use cultural norms to manipulate the public's reaction to scientific advances. Specifically we're going to use the stem-cell and cloning debate as a case study although the ideas we are going to talk about are not specific to this particular issue.

At 5:00 We're going to have a mini-writing workshop to help you start thinking about your final papers.

4:05 – 4:15 Clip, Tie In
When science shows up in the movies and on TV, it tends to be relevant to current research. Lately there has been a lot in the news about biotechnology – the sequencing of the genome, cloning Dolly the Sheep, the stem-cell debate and we see these themes come up in entertainment media as well. So to set the stage let's see a clip

CLIP: Gattica or The Island

Let's just go over some of the main ideas that we covered on Monday and how they manifest themselves in this clip. What were the two main portrayals of science [utopia/dystopia]? What do you think this movie is? Why? What issues is this movie addressing? What current topics does it tie to?

4:15 – 4:30 Tie to Paper

For today everyone should have read "Forecasting Science Futures". This paper was about the stem cell debate in the UK, but the topics are relevant to the debate in the US as well. First off, does anyone have any questions about the paper?

The paper makes a couple of important points that you will see coming up over and over again this quarter. [write these on board]

1. Scientific debates often center around the future implications of discoveries
2. The media often creates two opposing camps:
    a. Utopia/HOPE
    b. Dystopia/Caution
3. Both sides manipulate vocabulary of the discussion to further their point
4. Both sides invoke "expertise"

How do you think the way scientific debate is formed is influenced by popular culture? What does the paper say about this? What can you infer? Can you think of examples of this?

4:30 – 4:45 Group Activity – Articles
Get into small groups of 3-4
I am going to pass out some excerpts from some articles about stem-cells and/or cloning. Look through the articles with your groups and see if you can find examples of these items that we have talked about.

4:45 – 5:55 Large Group Discussion
Let's come back together as a big group and talk about what you found in the articles?

4:55 – 5:00 Wrap-Up for First half

5:00 – 5:03 Switch Gears
Ok, I am going to have to cut the discussion on all of this short. But keep these ideas in mind as we discuss other topics later in class. Now we're going to switch gears and talk a little bit about writing. As you know, you have a final paper assignment in this class. Since science in the media is such a diverse topic, we've left the assignment more open-ended to allow you to pick a topic that you are personally interested in. The flip side to this is that it can make it a little harder to pick a topic. Topics are due in XX weeks. So today we're going to talk about how to formulate a good thesis statement and to clearly define your paper topic.

- Who has heard of a thesis statement before?
- Ok, what is a thesis statement?

5:03 – 5:05 Good example
Here is a good example of a thesis statement (on an unrelated topic so that nobody worries that I'm taking their paper idea). Let's go through the parts of a good thesis statement:

- Specific topic statement

- Precise opinion
- Reasoning blueprint

[highlight each of these in the example statement as we go through]

5:05 – 5:10 Good, Bad, or Ugly?
[pass out voting cards]
Alright, now we're going to go through some example thesis statements. Each of you has a voting card. Read the thesis statement and then hold up the voting card "thumbs up" if you think this is a good example, and "thumbs down" if you think this is a bad example.
[call on one student for each vote to explain why for each statement]

5:10 – 5:15 Reiterate/Assignment
So, just to summarize, a good thesis statement has three parts: a topic, a precise opinion, and a reasoning blueprint. It should be clear from your thesis statement what the rest of your paper is going to contain. A thesis statement is NOT: an observation, a question or a promise.

So, for next Wednesday we want you to come up with the thesis statement for your final paper. Look through the topics on the syllabus to get an idea for some of the things we will be talking about it class. If you have any questions, feel free to email one of the instructors, we're more than happy to answer questions about the upcoming topics. I know it seems early, but we want you to get a jump-start on thinking about your topic and collecting resources for your paper. Before class on Wednesday, please post your topic to the discussion board on blackboard and also turn it in to the drop box. By the following Monday, respond to at least one other person's topic. It doesn't have to be a long post, just weigh in on their thesis statement.

5:15 – 5:20 Wrap Up
Any questions about anything we talked about today?
Questions about either the assignment from Monday or the one from today?

Final Paper Assignment

Your final paper can be on the topic of your choice as long as it relates to Science in the Media. You will need to make sure that you have a clear thesis statement and aren't just summarizing information that we have already covered. In order to help you plan and revise your paper, there will be a series of small assignments that all contribute to the final grade (point values listed below). Since we are giving you the deadlines ahead of time, no late excuses will be accepted.

Your paper should be between 10 and 15 pages in length. Double spaced, no bigger than 1-inch margins. The total assignment is worth 100 points, and 40% of your grade.

Step 1: Thesis Statement
10 points
Due: Wednesday January 24 at 4:00 PM

Write a 1-2 paragraph description of your topic and briefly discuss the evidence you plan to examine. Turn in a copy both by email to the instructors and post your topic on the discussion board section of blackboard. Read through some of the posts by other students and post a comment to at least one other post. Note that this assignment is not completed until you fulfill all parts.

Step 2: Outline
10 points
Due: Wednesday January 31 at 4:00 PM

Turn in a detailed outline of your paper along with at least 4 works cited, formatted properly. Turn in via email to the instructors.

Step 3: Rough Draft I
10 points
Due: Wednesday February 7 at 4:00 PM

This should be a complete draft of your paper with citations, etc. Turn in via email and also bring a hard-copy of your paper to class.

Step 4: Peer Critique
15 points
Due: Wednesday February 14 at 4:00 PM

You will have received another student's paper in class. Your job for this week is to turn in a thorough critique using the rubric handed out in class (this is the rubric we will use to grade the final papers).

Step 5: Second Draft/Instructor Meeting
15 points
Due: Wednesday February 21 at 4:00 PM

This should be another complete draft of your paper, addressing both the comments of your peer reviewer and any other corrections you wanted to make.

During the week of February 26th, you will have a 15 minute appointment with one of the instructors to discuss your paper before the final draft is due.

Step 6: Final Draft
50 points
Due: Wednesday March 7th at 4:00 PM

Due to instructors via email and bring a hard-copy to class.

CS 110 – Programming Assignment 1
Winter 2004

Assigned: Monday January 12, 2004
Due: Monday January 26, 2004 by midnight
This assignment will be turned in using the course blackboard site. Instructions on how to do this will be posted there soon.

Professor Dumbledore is great at casting spells, but he's not so good at math. Your assignment is to write a program that will help him compute the mean and percentages for his Magic Potions final exam. There are five students in the class: Harry, Hermione, Ron, Malfoy, and Cedric.

Your program should:

- Ask Prof. Dumbledore how many questions are on the exam.
- Ask for the score for each student.
- Calculate the percentage for each student and the mean for the exam.
- Output all the information in a user-friendly way.

Here is an example of what your program might look like when it runs. Your program should print out the questions and the user should enter the information (in this example, user input is shown as **bold** text). Feel free to create your own formatting for the input and output, but keep it user-friendly and readable.

How many questions were on the exam? **19**
What was Harry's score? **16**
What was Hermione's score? **19**
What was Ron's score? **12**
What was Malfoy's score? **3**
What was Cedric's score? **7**

Output for this assignment should look something like this:

Final Exam Scores for Magic Potions

Student	Score	Percentage
Harry	16	XX.X
Hermione	19	XX.X
Ron	12	XX.X
Malfoy	3	XX.X
Cedric	7	XX.X
Mean	XX.X	

your project should fill in the numbers where the Xs are

If you have questions about the assignment please post them to the Blackboard site.
Good Luck!

CS 110 – Lab #2
Wednesday January 21, 2004

Goals:

- Start a project from scratch in Visual Studio
- Master input and output with format specifiers
- Use constants with #define
- Introduction to simple functions

Project: Tax Calculator

For this lab we will write a simple program that asks the user to enter the price of an item they wish to purchase and returns the amount of sales tax that will be charged, and the total price. For example, a run of our program might look something like this:

> Please enter the amount: $**12.75**
> The tax on $12.75 is: $0.79
> The total price is: $13.54

For this assignment we will use a constant to hold the percentage sales tax (6.25%).

Before you start:

- What variables do we need? What should we name them? What type should they be?
- Review: why use a constant? How do we declare and use a constant?
- How do we use format specifiers to create organized output?

Part II: Functions

Now, write the program we just wrote so that it has the following:

- A tax_calc function that takes in an amount and returns the tax for that amount
- A main function that asks the user to enter an amount, calls the tax_calc function to compute the tax, and prints out the tax amount and the total amount.

CS 112 – Sorting

Today we are going to code the selection sort algorithm that we went over in class yesterday and use it to sort some data. Just a quick reminder about the selection sort algorithm:

> Scan the entire list to find the smallest value. Exchange that value with the value in the first position of the list. Scan the rest of the list (all but the first value) to find the next smallest value, then exchange it with the second position of the list. Continue this process for all but the last position (which will end up having the largest value).

The animation that we went over in class is at the following link:

> http://maven.smith.edu/~thiebaut/java/sort/demo.html

1. Login to any departmental Dell PC using the username and password.
2. Startup BlueJ and close the existing project
3. Create a new project via the File menu
4. Create a new class called "program" using the *New Class* button
5. Delete all the code that BlueJ creates inside the class
6. Create a main method

```
Public static void main (String[] args) throws Exception
{


}
```

7. Inside the main program, create an array of 10 strings and fill it with values. They can be any strings you want (even random), in my example I used my CD collection for inspiration:

```
public static void main (String[] args) throws Exception
{
      String[] bands = new String[10];
      bands[0] = "Beatles";
      bands[1] = "Rolling Stones";
      …
}
```

   Print out your unsorted array – you will also want to print the array after it is sorted, so a printing function will be useful

```
public static void printList (String[] list)
{
      for(int i=0; i<list.length; i++)
      {
            System.out.println(list[i]);
      }
}
```

8. Create the stub for a sorting method (leave it blank for now)

```
public static void selectionSort (String[] list)
{

}
```

9. Compile and run everything to make sure it works (remember that to run a program in BlueJ, right-click on the program class and select the main method. Click OK in the method call window. A new window should open with the results of your program. To clear the window between runs, select clear from the options menu.

10. Now create the inner `for` loop to sort one item (the first item in the list). Print out the array after this loop runs. Remember the steps for the inner loop are

    a. Go through the entire array and find the smallest element
    b. Swap that element with the first element in the list

11. Compile and run again, look at the output and make sure that the smallest (alphabetically) item got moved to the front of the array.

12. Now create the outer `for` loop that goes through and sorts all of the items. Make sure you update the inner loop and other variables to reflect the new outer loop.

13. Compile and run.

CS 110 – Pop Quiz #1

_____

1. Find and fix three of the errors in the program below (note: we are asking for syntax errors, not style goofs).

```
/* octopi.c
   This program prints out the number of legs in a group of octopi
*/

#include <stdio.h>

#define LEGS_PER_OCTOPUS 8;

main()
{
        const int legs_per_oct = LEGS_PER_OCTOPUS;
        int total_legs;

        printf("Please enter the number of octopi: ");
        scanf("%d", &number);
        total_legs = legs_per_oct * number;
        printf("There are a total of %f legs\n", total_legs);

        return 0;
}
```

2. Short answer questions.

   a. Every program must have a function named _____

   b. A named, reserved address in memory is a _____

   c. The four built-in datatypes in C are:

_____ _____ _____ _____

3. Evaluate each of the statements in the program below and write the result in the space provided (all answers that are double or float **must have a decimal point** for example if the answer should be a float, write 2.0 not 2)

```
int main()
{
        int a = 3;
        int b = 5;
        float c = 7.0;
        double d = 1.0;

        int x;
        float y;

        x = a / b;                          _____

        y = a * b;                          _____

        y = (c / b) + a;                    _____

        y  =  (float) b / a;                _____

        x = b + a * c – d % a;              _____

}
```

What Makes a Good CS TA?

Time: 1 hour

Objectives:

- Get new TAs to think about their own experiences as students/teachers
- Have new TAs spend more time interacting / get more comfortable with each other
- Arrive at a consensus of what skills are important for being a good TA to motivate the rest of the workshops

Materials:

- Chalkboard/chalk

Description:

- Ask students to reflect on their experiences as students/teachers – have them brainstorm a list of several things that **good** teachers did that distinguished themselves and several things that **not-so-good** teachers did. Ask for specific examples, particularly CS ones.
- Ask students to get in small groups (3 or 4 depending on number of people, if enough people, try to have groups be different from ice-breaker pairs)
- Have students share lists and combine (10 minutes)
- Bring whole group back together and have groups share the traits they came up with and write on board (divide into good traits and not-so-good-traits)
- Talk about the good examples and how to incorporate them into the new TAs own classes

Professional Development

Teaching Assistant Fellows (TAF)

As a teaching assistant fellow, I co-facilitated a workshop for new TAs in the engineering school. After summer training sessions, we led a half-day workshop covering the basics of TAing, including running lab sessions, grading, office hours, and dealing with issues that arise in class.

Teaching Certificate Program (TC)

In the teaching certificate program I got the chance to read about and discuss major issues in teaching and learning such as mentoring, course planning, and evaluation with other graduate students who were also interested in teaching. In addition to getting a great background in the literature, we got to put our ideas into practice by co-developing and teaching our own interdisciplinary course. I worked with a post-doc in biology to design and teach a writing-intensive freshman seminar on science in the media. The experience of designing a course from scratch was invaluable, I am very glad I got the opportunity to do it in a supportive environment with feedback at each step.

Preparing Future Faculty (PFF)

In the preparing future faculty program got the opportunity to visit a variety of different schools: a liberal arts college, a community college, and a city college. I also got the opportunity to guest lecture twice in an introduction to computer science course at a liberal arts college. I really enjoyed this opportunity since I got to experience the difference in approach between a large research 1 institution and a smaller school. I also enjoyed getting to see another perspective on how to teach introduction to computer science. Feedback from my PFF mentor further helped me shape my career goals and my teaching philosophy.

Teaching Consultant

As a teaching consultant I conduct teaching evaluations for instructors and professors at Northwestern. The evaluations involve taking the students through the small group analysis process to elicit feedback on aspects of the course that are going well, and aspects of the course that are not working. I compile the results into a report, and then meet with the teacher in a follow up meeting to discuss the results. I have really enjoyed conducting these evaluations since they give me a chance to see a variety of courses and students from all different areas and levels of the University. I was also able to take things that I learned from students in small group analysis and apply them to my own classes.

Evaluation of Teaching

Letter from Class Observation

I try to incorporate evaluation of my teaching into courses throughout the quarter instead of waiting until I get teaching evaluations at the end. During the quarter that I co-taught the freshman seminar, another teaching consultant from the Searle Center observed our course and did a small group analysis where he elicited feedback from our students.

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February 16, 2007

To Whom It May Concern,

I had the distinct privilege of observing Kate Lockwood teach a freshman seminar on Wednesday, February 7, 2007.

In this class of approximately fifteen students, Kate guided the group through a carefully crafted exercise designed to show how the popular press interprets scientific research. As students compared mainstream news reports with the journal articles on which they were based, I observed how they came to grasp the vagaries of media interpretation. Working in small groups, the students responded to Kate's probing questions with energy and insight. Respect and appreciation for her expertise and skillful deliberation were immediately evident in all the students' responses.

I was likewise impressed with Kate's overall pacing, her use of multi-media resources, and the facility with which she shared class instruction with her colleague. Kate kept the conversation moving without seeming rushed or ignoring key questions. Her use of both printed media and digitally-projected web pages kept students focused throughout an exercise that in less capable hands might have veered off task. In the process, she maintained authority while also drawing out supportive commentary from her co-instructor. At the end of the class I was left with the impression of a teacher who enjoyed working with her students, was imminently prepared for classroom instruction, and knew how to guide her students into a rich discovery process.

Any institution that hires Kate will gain a superb teacher who not only practices good pedagogy, but – as is evident from conversations with Kate – has grounded her technique in careful consideration of the scholarship of teaching and learning.

Sincerely,

Tobin Miller Shearer
Northwestern University
Doctoral candidate
Department of History
Department of Religion