TEACHING STATEMENT OF BRENT M. DINGLE

Would you be here if you knew what you were getting into? I would.

1   Introduction

This document reflects my general approach to teaching and creating educational environments. It was first written in 2005. I have refined it multiple times. Each refinement I think I will be changing things, yet each time the details change and the general ideas remain much the same. So after a decade of practice I find I still hold to the same basic ideas with which I began. This could be a sign of stubbornness, but I believe it is more than that.

The document is divided into three sections: philosophy, implementation, and research. The philosophy section provides a general statement of how I define teaching. The implementation section provides four distinct items I believe must be addressed while teaching. It also offers some examples of my teaching experiences, good and bad. The third section provides a brief description of my research interests and how they relate to teaching.

2   Philosophy

I believe a teacher is responsible for more than the simple presentation of information and should be concerned with the long-term educational development of every student. In this I define teaching as the presentation of material in such a manner as to explain how the material may be understood, remembered, and applied. With this definition of teaching in mind, I define the success of teaching to be a measurement of how well the students learn the material and improve their critical thinking skills. This success may be quantified in the first case by asking direct questions to a student regarding the material. The latter may be measured in how well a student defends the answers he or she presents and by examining how well the student can reapply the material presented within the class. Note however, the success is dependent on the student and the teacher.

3   Implementation

There is only so much a teacher can do. Yet the teacher must do some things. I believe there are four major items to be addressed in any teaching environment. And honestly, there are probably more than four, but I have a finite amount of paper. So these select four items are: attention, structure, feedback, and attitude. Each is discussed with examples in the following subsections.

3.1 Attention

While teaching various classes I found the larger the class the more difficult it was to hold the attention of students. This was an immediate concern of mine for I felt if they were not listening they were not learning. To alleviate this problem I found adding history or stories to the material often helped. Relating topics to things the students already understood also helped. For example the stacks and queues of computer science jargon are directly related to the act of getting lunch. And eating is a pretty popular and well understood activity. Specifically, the line to order food is the queue and the trays to carry the food are stacked. In similar fashion, when talking about matrices and their indexing methods I found that relating this topic to sports arena seating added interesting conversation to the discussion. I also found graphics, animation and video helped greatly to hold the students' interest. So while text, equations and code are required, pictures always seem to give better understanding, and hold interest and attention. Once I had their attention it was critical to do something with it. This meant providing the students information in a useful manner. This leads into the next topic of structure.

3.2 Structure

I found most of my students learned better when the material was presented in a consistent and structured manner. My more successful attempts at this came from my own class experiences. The classes I found easiest to follow all implemented a rather simple presentation style. In general the structure went something like: collect homework, review material presented in the previous class, allow questions on homework and previous material, present new material, allow questions, and assign homework. Hidden in this simple presentation layout is a more complex structure. It establishes expectations and puts order on events. After the third or fourth class the students generally catch on to this. Basically they have three opportunities to learn the material: the first time it is presented, the time they spend doing the homework, and the time it is reviewed. It also implies they are expected to do the homework, so they can ask questions when it is reviewed.

This works well as a structure for day-to-day activities. But I also like to combine this with a larger scope of goals and expectations, particularly since some homework can run across multiple weeks. At the highest level this is achieved in the syllabus. However I found giving a week-by-week breakdown of material also provides the students the opportunity to plan their own activities better, optimistically to allow them to work ahead. To illustrate this better, for computer science classes I initially gave large programming assignments. These would cover four or more weeks of time. This failed. The better approach proved to be smaller assignments, allowing about seven days for each with each task building upon the next to achieve a larger accomplishment. Along the way each task related to the material being covered for a given week. All of this was presented up front, so the students could see how topics would progress into assignments, and assignments would progress into a bigger picture. This took some practice to achieve, and required refinement. As an aside, it has also proven useful in an industrial setting. So the methodology it implies is also a learning event, beyond the material itself. Specifically, in leading teams of programmers it has been necessary to break work tasks into manageable pieces while at the same time trying to achieve a larger goal. This also relates back to the syllabus where the master work schedule for a program (or department) would be the syllabus. So even in structure there are lessons and this relates back to teaching students how to think and reapply material and methods learned.

3.3 Feedback

The third critical component to teaching is feedback. There must be communication between the teacher and the students. This also means there is accountability, on both. Relating this back to structure, goals and expectations have been set. The students will be expected to do homework, attend class, take tests, and ask questions. The teacher, however, also has expectations to meet. The teacher has promised certain events will happen. The students expect these to occur. The teacher must grade the homework, prepare presentations, grade tests, and answer questions. All of these expectations require communication. They provide feedback to the students and the teacher. They provide indicators on how well the students are doing, and how well the teacher is doing. Key in this is open and timely communication. So I believe assignments and prompt grading thereof are important. I believe office hours are important. I also found, on occasion, the teacher must initiate communication. The students always have opinions, but they do not always give them. The other important part of feedback is using it correctly, which leads into the next topic of attitude.

3.4 Attitude

The most often overlooked aspect of teaching is attitude. They say students always have a bad attitude. That may be true, except it isn't. College students, whether by individual choice, parental persuasion, or societal perception, chose to enroll in college. Some may be arrogant, apathetic, indifferent, egotistical, and may create the most hostile form of audience. But they are in college, by choice. Most I have found do not possess such bad attitudes. So if the students truly do not want to be in class, it is their money, and their choice. I cannot force them to attend. But if they do attend, by their own choice, I have a responsibility to them. This is where attitude becomes very important. I have very few expectations with regard to a student's attitude in class. I cannot control that. I can however, request their respect. This I believe is the first step in earning it, for the act itself can be respected.

What does respect have to do with attitude? The answer is nothing and everything. I cannot control the attitude of anyone, except myself. And I am the one standing in front of the students. I am the one they are watching. If my attitude is poor, they have no reason to make theirs better. To illustrate the point I shall give an example of not only bad attitude, but poor use of feedback.

One of the worst things I ever did was give the complete answer to a programming assignment before it was due. I did so in a moment of frustration. And I was not paying attention to what was actually happening. It was a two week assignment. Two or three days before the assignment was due, I was plagued with questions and had been for the previous ten. The students just did not understand what to do. This was feedback. I knew they knew the material. They had the information to complete the program. My attitude was poor at the time. I was seeing them as lazy and not listening and not trying. What I missed was how poorly the assignment details were written. So I kept telling them the same thing, over and over again. This did not help them. I should have restated the assignment and framed it in a better context with respect to the material. I did not see that at the time. Instead I

told them I thought they were being lazy and not trying, and I gave them the answer. I wrote the entire program on the white board in about ten minutes. I never recovered the respect of the students. I felt terrible for the remainder of the semester. I hope I never perform so poorly again.

This example also illustrates emotion is part of attitude. I was frustrated and pushed that to the students. But emotion can also be used positively. The obvious point is in excitement. Being excited about a topic is contagious. But other aspects of emotion can be used and conveyed in attitude. During the times I was most successful at teaching I find, almost always, I was using a form of empathy. I positioned myself, or my words, as coming from the viewpoint I believed the students had. I can't say I always guessed their perspective correctly, but I believe it helped. So from a teaching point of view that worked, particularly in one-on-one and small class settings.

So, attitude is important. I believe in establishing and maintaining respect. Doing so allows me to expect more from the students and get a response from them. Remembering attitude is reflective is very important.

4   Research

My research interests are in simulation, graphics, and gaming. This provides opportunities in my teaching. The first is one of conversation. Video games are easy to talk about and computer animated movies even easier. This leads to a second opportunity, the chance to capture and hold attention. This provides a third, the possibility to inspire the imagination. With luck this builds to a fourth opportunity, where the student gains enough interest and drive to try something new. This helps the student. It can also help me or others gain assistance and interest in research areas. For me, I am currently interested in exploring ways to design and develop robust, modular, adaptive simulation and game engines, and the associated tools. The exact direction of my research is itself adaptive. It will likely conform greatly to the interests of my peers and students. The ability to adapt also helps my teaching and can give the students opportunities to do research.

5   Summary

In sum, I cannot force students to learn. No teacher can. That responsibility is theirs. My responsibility is to give them the opportunity to learn. In that, I have my sports event and favorite team selected. So, I find my joy is seeing them succeed and my pain is seeing them fail.

In terms of the future I see things this way: I enjoy math. I am passionate about computer science. I love computer animation. I love video games. Animation and games are very popular with a large number of people. Yet the details require a high level of understanding of computers and math and art and psychology and so on. Animation and gaming are a good context from which to teach and they serve as a motivation to learn. Relating to current events, mobile gaming is very popular at the moment. Framing or applying basic programming concepts to that endeavor is not terribly difficult. Actually writing the code and understanding all the details of implementation may be a little more complicated. But a hook is a hook. The point being I can and do use my personal interests and research to teach others. Therein is the combination of my passions and I believe that helps myself, and my students.