Teaching Practicum

Interactive Qualifying Project

Worcester Polytechnic Institute

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Introduction

Worcester Polytechnic Institute provides a teaching practicum to those students who want to receive an Initial License as a middle school or high school teacher in Massachusetts. Along students are finishing their major, they could chose to do a half year teaching in the areas of Biology, Physics, Mathematics or Chemistry. Before this program, students need to take a course (Teaching Methods), which is hold by a local school. This course introduces a lot of effective teaching methods. Students would learn how to get along with diverse learners and different technic resources. This course also includes a short history of education in America; curriculum and course guidelines; education laws; how to develop a course syllabus. During this program, students need to take psychology of education, cross-cultural psychology and sheltered English immersion. Taking these three classes is going to give students a larger area of education, not limited on teaching, but more on psychology side. After this program, students need to finish a paper to introduce the whole process and summarize what they learnt from this program. In this paper, I'm going to give a brief background about Massachusetts Education Reform Act of 1993; Massachusetts's performance relative to international community; an overview and history of Worcester Public Schools and the Tahanto regional high school which is the school I was doing the teaching practicum. After the whole introduction of these backgrounds I'm going to talk about the professional standards for teachers in Massachusetts. On the last pages of my paper, I give some ideas of my WPI education and my classroom. These two parts include how WPI education helped me in my classroom and how WPI change my education career.

Background

There is a big reform for the Massachusetts education from year 1993, and it's called The MA Education Reform act of 1993. There are several goals for this reform (from the document in 1999):

- Ensure standards and programs for students that ensure high achievement
- Establish a fair and equitable system of school finance
- Reform school and district governance to improve student learning
- Enhance the quality and accountability of all school personnel, and
- Introduce new models of school organization, finance, and parental participation.

By a lot of research have done before, we could see that Massachusetts public schools have achieved and finished all those goals since 1993. However still a lot of educational expert think there is a lot things people could do. For example, people think for the multiplicity race class, for the charter school, we could do more about the common core setting. Just like Tom Birmingham said in 2013 "We will make a massive infusion of progressively distributed dollars into our public schools, and in return, we demand high standards and accountability from all education stakeholders. This grand bargain is the cornerstone of education reform." For setting the common core for all the public school is not an easy thing to do in several years. But we should strive to improve K-12 public education. Indeed, this education reform has worked much better than we imaging.

When we talk about the MA performance relative to international community, people always have some concerns. Some may say, are U.S. students ready to compete? As an international student coming to America for college, I took SAT and SAT sub-test before I come to America. U.S. high school students have their advantage like English writing and reading. However, the challenge is especially is math, science and engineering. There are some words from Internet entrepreneur Vinton Cerf, "America simply is not producing

enough of our own innovators, and the cause is twofold—a deteriorating K–12 education system and a national culture that does not emphasize the importance of education and the value of engineering and science." For this issue, America raise a STEM (the Science, Technology, Engineering, and Math) organization. A lot of company wants to hire the people with more skills and knowledge of science and math, even computer science. Be analyzing the employees of the global 500, we could see most of the science and engineer parts of the company are Asian people. Most management parts employees are from U.S. Since the STEM organization has been setup, more and more American students involve with science and engineering career. There is lot more we could do for the education of science.

The school I've been student teaching is a public high school is Worcester public school system. Tahanto Regional high school is a public middle school and high school located in Boylston. There are four levels of the courses being offered in Tahanto. These are: Advanced Placement (AP), Honors, College Preparatory, and Life Skills – Vocational. "Graduation requirements include passing scores on the MCAS (Massachusetts Comprehensive Assessment System) in areas of English, Language Arts, Mathematics, and Biology. Students must earn 110 credits to graduate, and must also pass a health course and computer literacy test. Beginning in 2014, students will be further required to pass a Technology class." The class I've been teaching is pre-calculus within 24 students. Worcester have a great educational opportunities for young generation. Worcester Technical high school is the one being very special. There are several school offer high school student attend to WPI or other college to listen some courses, to get the feeling of college. Overall, attending a public high school in Worcester is a great choice to learn and to know more about future college study.

Methodology

Case 1: Plans Curriculum and Instruction

Planning curriculum and lessons are the firs step to be an official teacher. And the first step to do this is clarified where I'm going. Just like Saphier said in 1980: "Eighty percent of those polled in an early validation study of the parameters thought the most important parameter of teaching was objectives." This is what I mean for plans: if we don't know where we are going, we cannot get there." So, when I was planning a lesson, there are three major questions I was keeping in mind. First: What do I want students to learn? Second: What teaching and learning activities will I use? Last one: How will I check for understanding?

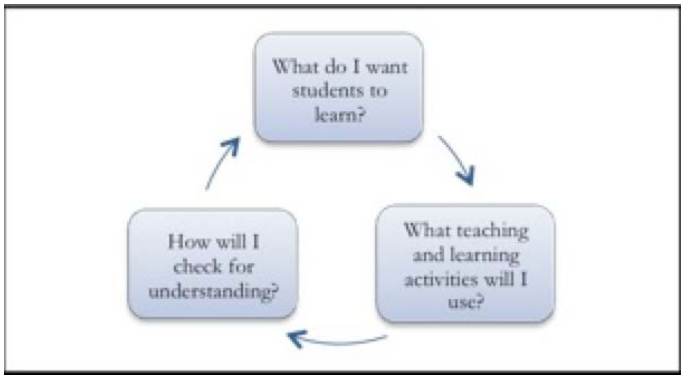

Figure1: Specifying concrete objectives for student learning

With these three goals, I started to make my first lesson plan. I want to be fully prepared.

Instructional Plan #1

Do Now

Give students an example for review ***What To Do*** *with solving a simple linear equation and a simple inequality.*

Example1 (linear equation):

2x+y=14

Steps:

1. *Transform the equation to solve for a variable. (suggest y)*
2. *Set up a table of values.*

X	*Y*
0	*14*
1	*12*
2	*10*
3	*8*
4	*6*

3. *Substitute Ordered Pairs*
   Ask ~~(6,20)~~ ~~(5,18)~~ ~~(1,13)~~ (7,0)

- *With ordered pairs remember (x,y)*
  (0,1) x=0, y=1

Exmaple2 (linear equation and inequality):

3x – 15 = 3

Solve: x=6

-5x + 2x + 1 <= -2

Solve: x>=1

2x^2 + 4 = 12

x=+- 2

5x^2 – 6 <= 14

x<=2

Steps:

1. *Simplify using the inverse of addition or subtraction.*
2. *Simplify further by using the inverse of multiplication or division.*
   (When multiply or divide an inequality by a negative number, you must reverse the inequality symbol. -5x+2x+1<=-2)

Motivation

We already know how to solving simple linear equations and inequalities. However math always has many relationships with our real life. Do you know if you have $10, how many hamburgers you could get at most form McDonald? Are you curious how the interest works in the business? Let's see how can we use linear equations and inequalities to solve real life problems!

But a problem came through this process. I come up with too many questions and examples for students. For students, they cannot get too much points at on example question. If they get a very hard example at the beginning of the class, their curiosity would be lacked. And they will think the material is too hard to get. For me, I remember the first class I gave them, I prepare about five questions for them for the first example. When I ask the question two questions, they had different answers with each other, and they started to compete with others. The classroom started become loud. I have to say "Guys, please listen to me…" I become nervous after this, then I started to mix up my mind and my questions for them. Being struggle for a while, my mentor helped me. After this, I change my Instruction to a simple style. Only one example with clear steps. Within this example, I give students a detail about the steps to solving this kind question. After they get what they need to do for this question, I'm going to give they more exercises.

Instructional Plan #2

Do Now

Give students an example for review ***What To Do*** *with solving a simple linear equation and a simple inequality.*

Exmaple1 (linear equation and inequality):

3x – 15 = 3

Solve: x=6

-5x + 2x + 1 <= -2

Solve: x>=1

Steps:

3. *Simplify using the inverse of addition or subtraction.*
4. *Simplify further by using the inverse of multiplication or division.*
   (When multiply or divide an inequality by a negative number, you must reverse the inequality symbol. -5x+2x+1<=-2)

Motivation

We already know how to solving simple linear equations and inequalities. However math always has many relationships with our real life. Like, one day, you go to McDonald, if you have $10, then how many hamburgers you could get at most form McDonald? And Are you curious how the interest works in the business? Let's see how can we use linear equations and inequalities to solve real life problems!

Case 2: Delivers Effective Instruction

During the progress of real teaching, I find out that planning a class is different with teaching one. There are a lot of problems would happen during a class. The best way for being prepared is plan different levels of questions and activities. In 1956, Benjamin Bloom and his group of educational psychologists developed a classification of level of intellectual behavior important in learning. During the year 1990, a former students of Bloom headed his group came up with a new version. The figure below is the new version.

Figure 2: Bloom's taxonomy

According to this method, I make a normal question list for myself to accomplish the goal of different level of class activities.

1. Remembering: Can students recall or remember the materials I taught before?
2. Understanding: Can students explain the concepts be themselves?
3. Applying: Can students use the concepts in a new exercise?
4. Analyzing: Can students figure out the difference between two parts?
5. Evaluating: Can Students justify a solution or a decision?
6. Creating: Can students create the new product?

This list helps me a lot for planning and re-exam my teaching. Mixing and matching the grouping strategies is another method. After I give an example or an exercise, I will put my students into a small group for a short discussion. Effective students learning can happen in a whole group setting or a small group. Before separate students into the groups, I do the following steps:

1. Explain new concepts or terms (especially for ELL students)
2. Highlight common errors for students to avoid
3. Narrate behaviors by explaining to students what I am doing and thinking at every step of my demonstration

Grouping not only gives students more freedom to discuss bur also gives teacher more time to observe how the students act and how well they actually learn from each other.

Case 3: Manages Classroom Climate and Operation

Manage a classroom for me is the most key thing I need to improve. There is culture difference between U.S. high school and Chinese high school. In China, teacher is the top of the education system. No matter students or parents need to follow the teacher. Parents need to prepare what teacher said for a course. Students need to listen to their teachers' line of the lesson. This is why the classrooms in Chinese high school are usually quiet. Most of the students are in some point "fear" their teacher. For the classroom, teacher do not need to manage or operate that much. Being the opposite of China. America high school tend to give students more chance to act and behave. This is why as a high school teacher, I need to learn how to manage a class. Mary Beth Blegan, he is former U.S. Department of Education teacher-in-residence. He said "The most important action an effective teacher takes at the beginning of the year is creating a climate for learning." My mentor also told me that it is very important to set up a rule when you first came into the classroom, then keep practice with your students with these rule until they can follow.

When I was doing the research about what kind of rule I need to set up, my friend give a suggestion of 12 steps teachers can take at the beginning of the year to promote the classroom management. These are form professor Howard Miller. He is a professor of Education at Lincoln University.

1. Develop a set of written expectations you can live with and enforce.
2. Be consistent. Be consistent. Be consistent.
3. *Be patient with yourself and with your students.*
4. Make parents your allies. Call early and often. Use the word "concerned." When communicating a concern, be specific and descriptive.
5. *Don't talk too much. Use the first 15 minutes of class for lectures or presentations, then get the kids working.*
6. Break the class period into two or three different activities. Be sure each activity segues smoothly into the next.
7. Begin at the very beginning of each class period and end at the very end.
8. Don't roll call. Take the roll with your seating chart while students are working.
9. *Keep all students actively involved. For example, while a student does a presentation, involve the other students in evaluating it.*
10. Discipline individual students quietly and privately. Never engage in a disciplinary conversation across the room.
11. Keep your sense of perspective and your sense of humor.
12. Know when to ask for help.

Form these 12 suggestions, I choice three of them to work for. Usually for a class, I would plan 20 minutes to teach, and for the rest of the class, I call students to work on the broad and discuss with others. During a students is working on the board, I will let other students to look at and see

if there is a step wrong or any new way to solve. In this way, most of my class are well involved and be fully developed.

Case 4: Promotes Equity

“No one is perfect, that’s why pencils have erasers.” This is a horizontal painting which is on the top of the board of the classroom. Everyone has chance to make mistakes. The two part of my equity in my classroom are gender equity and race equity. In my class, boys are act more and talk more during the class. Girls are quiet during the class. What I did is calling girls to answer the questions. Because they are doing great but they just a little bit shy about speaking in front of the class. When I was making the lesson plan for every class I teach, I write down the name list I will call on for each class. I always make sure that I call a least four boys and four girls during the class. After girls answer the questions, I encourage them to talk more.

Another part I always pay attend to is race equity. There is Asian boy in my class. He is very smart. He get most 100 for every tests. Every class he is very active to answer the question and he is the fastest person who come up the right answer. For him, I actually won’t let him answer the every question I gave. If he gives the right answer while other students are still thinking about it. This is not fair to other students. I give him a sign that I know he is very good to come up with the answer, but let him wait for a while. I call other students to answer, but if they are wrong, I will call him to correct. In this way, every students can get a chance to think about the question without any distraction.

My WPI Education

When I take look back at my WPI education, I see three words: practical, intensive and responsibility. As a typical engineering school, WPI always focus on how to use the technical rather than monotonous learning a lot. Every class I took in WPI has group work and lab, even business and math courses. Students always work as a group and apply the knowledge into an applicable form. I deeply feel that learning a technical ability is totally different with using that skill. This what I think one of the important part I need to tell and give my students—know how to use is the final goal for learning. I did pre-calculus when I was a student teacher. There were a lot of contents for students, like function and graphs, polynomial and rational function, exponential and logarithmic function. Those are indistinct and theoretical knowledge for high school students. Therefore, I always emphasize to them that only by getting what is this are not enough; you have to know how to use it. This is the reason my mentor and I usually show a lot of funny and dramatic video for them. These videos are close to their life. During they watch the video; they are assigned to answer some questions from what they get the video. More over, students are sometimes supposed to draw a unit circle and create anything they like. The second influence that WPI give me is working hard. Being intensive is almost every WPI student's attitude. For a science or engineering people, being curiosity and making great efforts are the two necessary manners. I could strongly feel about this. I think teaching high school student is different with teaching a kid or a college student. Giving them more choices and feeling to this world is same important as teaching them the academic knowledge. High school teacher need to makes their minds active instead of passive. As a high school teacher, I think we need to make our students become more and more sensitive for new ideas. This could open their world and

makes more possibilities. During this process, both of students and teachers would have more excitements of life and science.

Over all, WPI education helped a lot in my class. College life is not a step of my whole life, it is also a milestone of my education career.

My Class

My class has 24 students. No ELL and special need students. They are all very smart and nice kids. For an international student teacher like me, it is a lucky thing to me to have those nice and smart kid. Some may think, it should be very easy to teach them, but I did have some troubles. And I learnt a lot from this experience.

After a few days I spent with them, I found that most of the students who always seat on the first and second roll are very active for class activities. There are some girls seat behind are quiet and shy. They usually only talk to each other when we have a group discuss. Sometimes one of them has trouble for a question, they discuss privately. When they discuss privately during my teaching or my mentor's teaching, some other students are not satisfy. I want to see if they are just shy about answering questions or they just tend to just talk to friends. So I intend to let those girls answering questions during my class. At the beginning, their voices are pretty low and soft. But apparently, they like to answer questions. I also encourage them to rise hands during the class. About three weeks later, I could see their progress. After a few weeks later, I asked one of the girls why they were not that active during the class, she told me it's because their seats are in the back. Sometimes, teacher won't pay that much attention to them. As time passes, they tend to talk to others instead of rising hands. From this case, I look back at my high school experience. I had a rotate-seating every week. We change seats every week so that we would be able to know no matter where you seat, you should be able to know what you need to do during the class. Although, rotate-seat has some problems like students will be not that quiet because they are excited about changing seat, I still want to try this rule when I become an official teacher.

Figure 3: My classroom.

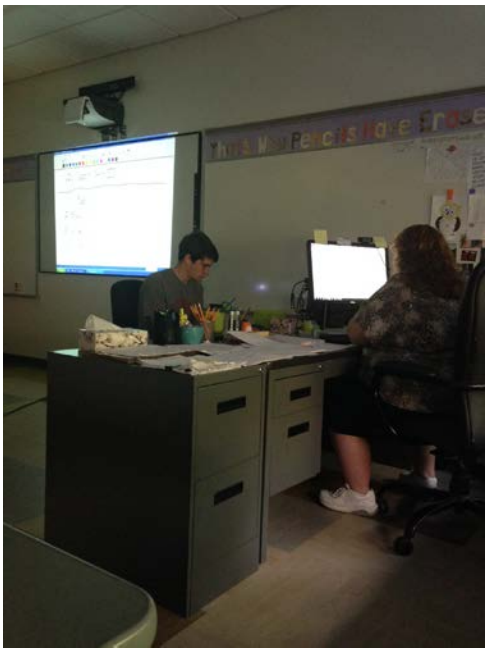

Figure 4: My mentor and my student.

Conclusion

Student teaching for almost half year is a wonderful and memorable experience for me. American high school students are very active. They can have a small breakfast during the class; they are not supposed to wear school uniform every day; they can arrange their courses by themselves. They have a lot of freedom to choose. This really gives me a great impact with the high school I've been attended to in China. In most Asian countries, middle and high school students have a lot of rules. Like they are supposed to wear the same school uniform every day and take same courses with other same grade students. The rules limit them. Compare to Chinese high school education, I prefer American style. It gives students a huge free area to create, to act individually.

There is a valuable character I learnt from my students. It's honest. Being honest to teacher, to knowledge, to themselves. The kids I've been get along with are very honest. I made a mistake one day. I calculate 4-2 into 1. There was a student ask me if it should be 2 instead of 1. When I find out, I actually laugh at myself. It's not much to be particular bring up. But I've been touched indeed. It's because the honest. If the same thing happen in China, in my high school. No one will correct the teacher, even if students know the teacher is wrong. However, for the most of the time students would rather believe in teacher not themselves. Being honest in knowledge is important. If no one want to correct authority, then nothing can be changed and nothing new will be crated. This experience let me self-exam my education methods. I will definite bring more criticalness into my class in the future.

The last thing I want to bring up is being responsible. The most memorable thing I've got form this experience. For a long time, I think being a high school students in U.S. is a very lucky and comfortable thing. Especially when I was in China, I watch a lot of American high school movie and drama. These thing gave me a great impact—America high school life is comfortable. Going to school around 9am, off school around 2pm, studying very easy materials. And then, being harsh when they go to college. This experience totally overturn my angle of America high school. This first class starts at 7:15 in the morning, the last class ends around 2:30pm. Students do a lot school work every day and they all have their goals for graduation. The materials they study are not easy at all, most of the junior and senior courses are related to college level. Students know what they are doing and they also know what they are going to do in the future. They have objective and responsibility for their incoming life. Those let me re-exam myself study in high school and college. "Being responsible is the beginning and the goal for an adult", my mentor in college told me so. Teaching benefits teachers as well as students. My mom who is

a college professor always tell me this. For now, I finally get what is this really means. Being a high school teacher is very “hard”, but it is as well as meaningful.

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