How to obtain a High School Teaching Certificate in a Science Discipline from WPI

A Interactive Qualifying Project Report

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IQP/MQP SCANNING PROJECT

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**Introduction:**

Teaching is a very interesting and rewarding for most people. However the path to become a certified teacher requires a lot of work since there are many requirements you must complete. You will have to prepare yourself for teaching by taking several courses that will fill state requirements and equip you with some of the many tools you may need. In addition you will be completing a Pre-Practicum, in which you will learn about how to make a lesson plan, deal with situations that may develop, and start observing teachers in action. Afterwards you will be placed in a school to be a student teacher. Then you will need to take the teacher tests to prove to the state that you are qualified to teach in a public high school. Finally I will tell you about my experiences.

The state of Massachusetts has set several standards that you must complete in order to become state certified. You have to take three classes at WPI to supplement your IQP. In addition, during your IQP you will find yourself completing 75 hours of
observing teachers and 150 hours as a student teacher. Before you panic about this large time commitment that you will be making, keep in mind that these 225 hours will be spread out over three to four terms. This works out to roughly 50-75 hours per term. This is about what you would put into a normal class here at WPI.

In addition you will find yourself reading and learning about different teaching methods in both your Pre-Practicum and your Practicum. You will be challenged to try some of these and to invent some of your own. In addition to learning about teaching you will become a better speaker from spending time in talking front of a class. As to teach you will find it to be both interesting and fun.

I found teaching to high school students to be a rewarding experience. In the process of teaching some of the kids you will make many friends among both the faculty and students. By being a college student and a student teacher you can better understand both sides of class. These insights are not be limited to just your high school teaching experience but can be carried over to your WPI experience. In addition you glimpse into life as a professional
teacher which could help you decide if this is the career choice for you.
Background:

In this section you will learn about what you will be covering during your Pre-Practicum. You will need to learn about human relations, curriculum planning, classroom management, and discipline. Other topics you need to be aware of are the changes in the Massachusetts education laws. You should also be aware of some of your legal responsibilities as a teacher and have some plans on how to get help if you need it.

1. When you teach you will be working with different people and will need to understand and work within the social structure of your school. You will need to maintain a professional relationship with your students. This is often difficult to maintain since they close in age to you and may play on your sympathies. It is also important to get to know your students; this will help relate what you are teaching to their daily life. Your relationship with your cooperating teacher should be friendly and professional. Your cooperation teacher will let you know how friendly a relationship he/she wants you to have. It is important to
remember he/she is there to help you, so you should be able to ask him/her for help without feeling like you are imposing. When you deal your supervisors/liaison/principal at your school you should maintain a professional demeanor and only relax if she/he takes the lead.

2. When you start teaching you and your cooperating teacher will be responsible for insuring that the students are taught the required material. He or she will give you a weekly class planner. You should write in it what you plan to teach each week along with notations with what you should cover everyday. Additionally you should include when you are giving out homework assignments and tests. After you have decided roughly how you want to teach your class, show your planner to your cooperating teacher for their approval. The next step is to write out lesson plans for each day. Your lesson plans should include exactly what material you plan on covering that day, what equipment you will need, their homework assignment, and any handouts you plan on giving out. You should try to have lesson plans prepared a week in advance, so in case you are out for some reason, someone can fill
in for you. After you teach your class it is important that you note
on your planner whether you completed everything you wanted to,
or jot down what they missed so you can complete it the next day.

3. When you take over a class you need to devise a plan to
take control and remain in control of it. When you go in the first
day introduce yourself and try to learn as many names of your
students as you can. You should additionally make a seating plan
of the class to both help you remember their names and help you
insure that they maintain the same seats throughout the term. By
having them stay in the same seats you can limit the amount of
goofing off they will try to do.

As class starts you will have to take attendance, but
afterwards you should vary how you teach your class. One idea
that was effective for me is to walk all about your class asking
questions to individual students from previous lectures and
homework. This acts as a sort of evaluation for you of how much
they understood from the previous class and could alert you on
topics you might want to review. This also keeps your students on
their toes because they need to keep an eye on you.
4. All students act disruptly from time to time and it is your job to maintain order in your classroom. As a teacher you will not punish disruptive students yourself, but you will instead send them to the vice-principal's office or guidance department who will deal with them. You should careful about sending too many students to the office because if you send too many you are implying that you can't control your own class. However, if you spend class time dealing with every disruptive student you will be wasting a lot of class time. Another solution you might want to try is to send the disruptive student you can't handle to your cooperating teacher and let him/her deal with the student. Most often you will able stop a rebellious student with a stern word as long as you stand your ground and stay calm. Be persistent and remain cool.

5. You should check with your WPI advisor on the current state requirements for college students wanting to become teachers. These standards have been going through a lot of changes in the past few years and this trend will be continuing with the controversy of providing a decent and proper education in
the Commonwealth of Massachusetts. It will be important to familiarize yourself on the current educational laws. You can find these on the Department of Education web page at www.doe.mass.edu. You should at least review the Education Reform Act of 1993. This act heralded in many changes about how school would provide education. The Reform Act of 1993 redrew district lines and redistributed how money was spent on schools. Additionally communities were empowered to start their own schools if they felt that their local schools were not up to par. These schools are called charter schools. Additionally, you should review some of the older education laws to gain better understanding of where some of the older teachers are coming from in regards to their curriculum, teaching methods, and ideology.

6. As a teacher you should be looking out for your students. If you notice bruises or injuries that look like child abuse you MUST report it to your superior. You are legally bound to report any injury you suspect is child abuse. If you are unsure check with your cooperating teacher. Another issue that you need to be
careful about is discrimination. You may think you are not discriminating against anyone but you need to devise a plan to test yourself to insure it.

As a student teacher you should not be involved with parent-teacher conferences. Your cooperating teacher will handle those since some parents may try to twist your words back at you to cause trouble. Additionally they may try to trick or intimidate you since you are new at this. You should supply your cooperating teacher with any information he/she may need while talking to parents, i.e., attendance records, spreadsheet of grades the student has received, and any additional comments of the student's performance like behavior.
Procedure:

In this section you will learn both about what you need to complete in order to be placed in a school and what to expect when you are placed in a school. There are seven steps you need to follow to prepare and complete your student teaching. You need to take certain classes to prepare yourself to teach. In addition, it is necessary that you set up your schedule to accommodate teaching in a high school. Before your advisor can place you in a high school to complete your Practicum, it is necessary that you complete a Pre-Practicum. Once placed in a high school you will have many questions about what your responsibilities are. Additionally you will want to know what standards you will need to maintain at the school. Finally, you need to learn about the 7 Teaching Competencies, which you will be graded on in school.

1. Early in your WPI experience you need to schedule these required classes in order to qualify for a teaching certificate: Psychology of Education, Cross-Cultural Psychology, Elements of Writing, and Wellness. By taking these classes you will satisfy the
state's requirement of classes needed outside your major and learn some of the necessary skills and background. Psychology of Education covers a lot of theory in regards to teaching, while Cross-Cultural Psychology goes over the interracial issues you will be dealing with as you teach. Elements of Writing is required to ensure your language skills are up to par and because one part of the teacher test deals with English Competency.

2. As you plan your schedule at WPI keep in mind that the state requires a certain amount of credit in your subject area to determine that you are competent in your field of study. This number changes from year to year. Basically this requirement means that you can be qualified to teach one subject area only. Some problems can occur if you do not major in a basic discipline, because the Department of Education only issues certificates in certain educational fields. This would only really cause problems for interdisciplinary majors or for those with majors that don't relate to high school classes. These problems can be avoided by scheduling your elective classes in areas that you are lacking. You need to keep in mind that while you are teaching it will take up
almost all your time and you will have little time for your classes and other activities

3. As you plan to schedule your student teaching/Practicum you must remember that it is a very time consuming activity. If you are planning to complete your Practicum as your IQP, you should register for 2/3 in one term and 1/3 in the next term as your IQP. By doing this you will only have to take one class one term and two in the other. You should schedule easy courses in the late afternoon or evening while you are doing your student teaching since you will not be getting out of school until at least 2 PM. You should plan on being at your school all day from 8-2. Another arrangement would be for you to complete your student teaching as a Cooperative Education Program (CO-OP). This would free you from classes for the semester to give you time to complete your Practicum. However, unlike most CO-OPs you will not be paid. As you schedule your student teaching, some factors you need to consider are grading periods, continuity with students, rotating schedules, and participation in other school functions. Different high schools have
different cycles and teachers wouldn’t want you to take over a class near the end of a marking period because it wouldn’t be the right time for the transition from the teacher to you. Once you start teaching you need to continue to the end or your term there because if you and the cooperating teacher switch back and forth it makes it harder for the students since there is no continuity. If a school has a rotating schedule you must realize that if you are teaching three 1-hour classes, that could cause you to have these classes at different times everyday. This will affect your planning of your schedule by requiring you to keep a large block of time open every day for your Practicum even if most days you won’t have a class then. Additionally, you should attempt totaling up the number of hours you are planning on teaching to see if it meets the state requirements. Massachusetts requires you complete 75 hours of observation, and 150 practice teaching hours. In the observation you will be watching teachers instruct their students and deal with issues in the classroom. This is a great time to look for different ideas and approaches for you to try in the classroom yourself. This period of watching in addition to helping
you learn classroom management, gives your cooperation teacher some confidence that when you start teaching that you have had time to prepare yourself for it.

After you have finished planning and scheduling your teaching, you need to complete your Pre-Practicum. The first thing you need to do is to apply for a CORI, this is a background check to make sure you are of sound legal/moral character. This is a safeguard to prevent the school system from putting a criminal or a person of dubious motive in an authority position in charge of impressionable young minds. You should plan on submitting your CORI application at least 2 months before you plan on starting to teach because it can take 2 to 6 weeks to process. Additionally, you should study and practice different teaching methods to give you a larger repertoire of skills and abilities when you start teaching. You should also practice making lesson plans and scheduling work outlines. Different topics that you should cover include: human relations, curriculum planning, classroom management, discipline, teaching strategies, teaching to diversity, teaching across the curriculum, and the other responsibilities of teachers.
4. When you get placed in a school you will be interviewed by and also interviewing the staff at your school. You should prepare yourself with a list of questions and concerns that you may have. Common questions would be:

-How many classes will you be able to teach?

-What facilities do they have available to assist teachers?

-Will you be able to utilize Computer labs?

Additionally, find out about personal issues or needs.

-Will you need a key to access the teacher’s bathroom?

-Will they have a desk or some space to put you so that you can work at school and meet with students?

-Ask for a copy of the school rules and regulations, and for the teacher’s guidebook for you to read.

-Find out what other jobs/ responsibilities you will have to do such as lunch duty, hall duty, and bathroom duty for example.

-Inquire about transportation and where you can park your car.
-Check to see what sort of ID you need to be either wearing or have to have on you at all times.

5. You will want to experiment with different teaching styles to observe their effect on your students. One example would be to vary clothing styles that you see based on different teachers to see how the students respond to you as a teacher. As you complete your observations, you should try to observe as many different teaching styles as you can so you can try them out when you teach to see what works best for you. Your student teaching experience is a chance for you to learn how to teach and try out different ideas. As you complete your observations and teaching make sure you record the time you have spent on it. The state requires written records of the time spent in observation and teaching. In addition you should have your supervising teacher sign these logs for accountability. Your cooperating teacher can assist you with these experiments by providing advice, or suggesting new ideas. In addition your liaison to the school is a useful person to go to if you need help.
6. You may have some problems being mistaken for a student because you are only a few years older than some of your students. A good way to deal with this problem is by maintaining a professional appearance. Most teachers dress by wearing a jacket and tie or a button down shirt. You may also find faculty members in casual clothes. A shirt and tie would be acceptable if your wardrobe and budget don't allow for a jacket. You should avoid wearing blue jeans instead wearing slacks.

As you are teaching you should try to get feedback to evaluate how well you are teaching. Try to get feedback from both your students and teachers. Be careful when you try to get information from students, as obviously some of the comments will not be practical or reasonable. A course evaluation like what is used at the end of class at WPI would work fine.

7. You need to understand the different factors of which your cooperating teacher will grade you on. Your cooperating teacher, based on their observations of your teaching, will evaluate you on the following competencies.

- Competency 1: Subject Matter Knowledge- You will judged on
how well you know your field

• Competency 2: Communication Skills- Your ability to communicate with students with regard to their ages, level of development, gender, race in a sensitive manner using language appropriate to your students

• Competency 3: Instructional Practice- How familiar with the principles of curriculum and instruction are you; Do you know different strategies for integrating special education students into regular classroom settings; Can you make the curriculum relevant to the experience for your diverse classroom

• Competency 4: Evaluation- How well do you evaluate your student through different procedures of your design to assist their learning; Do you evaluate yourself to improve your student teaching

• Competency 5: Problem Solving- Can you think critically about teaching and learning; Are you able to encourage students to think creatively and to develop analytical thinking skills

• Competency 6: Equity- Do you treat all students equally and responsibly; Do you understand the impact that western and
non-western civilizations have had on contemporary American culture; Can you use this knowledge to develop strategies to assist you in your teaching and dealing with your students.

- Competency 7: Professionalism- Do you understand your legal and moral responsibilities to your students and the school; How well can you learn from your experience and supervision; Are you able to devise strategies that deal with the impact of societal problems that many students face today.

Checklist:

- Plan on taking the following classes before or after (preferably before) your Practicum: Psychology of Education, Cross-Cultural Psychology, Elements of Writing, Wellness

- Schedule to have a an open spring semester in your junior year or at least easy late afternoon or evening classes

- Check with your advisor on the current status of educational standards required for teaching by law

- Make sure the classes you are planing fulfill the requirements for competency in your field of study
- Apply for a CORI (background check)

- Plan to complete your Pre-Practicum the term before you start teaching

- Learn the many skills you will need as a teacher for both inside and outside of the classroom

- Review literature on the different methods and ideas about teaching

- Have your advisor place you in a school

- Teach
Results:

From for teaching you will learn numerous things; in this section you will find different ideas of things to do and discussion on different topics that you will encounter in the classroom. A few topics that you will be seeing are the important of making routines, your dress appearance, the used of different teaching aids, the effectiveness of integrating games into the curriculum, and the importance of homework. Additionally you will learn about to deal with grades and the usefulness of different forms of evaluations. Finally you will hear about some of my experiences teaching high school biology.

1. Routines are better for both students and teachers because they enable the students to be more relaxed and to prepare themselves for class by knowing what to expect. Additionally, you will find that a routine simplifies your job of making lesson plans. However, you should vary from a routine occasionally to liven up your class to keep it from becoming boring or overly repetitive.

2. By experimenting with seeing how by wearing different dressing styles, you will find that students will respect you more if
you dress in semi formal wear (shirt and tie for men, conservative skirt and blouse or dress for women). After a teacher establishes himself/herself as an authority figure you may have noticed that your attire doesn’t matter very much. Since it is unlikely that you will be able to establish yourself due to both your age and inexperience it would be best for you to dress to impress. However if you had problems getting started, it was more important that you keep up a more professional image to control your students.

3. You will find that different teaching methods and teaching aids work effectively among students to a certain degree. When you are trying to teach structure or describe something complicated, the use of overheads or handouts is very effective. If your class seems hesitant to take notes, use handouts as homework based on the lessons to encourage note taking. Additionally, this will also give them a hard copy of the key points to hold on to study from

4. Also, you will find that most students will respond better and will often support you when you try to incorporate learning games and interactive activities. They often find these activities
fun and offers them something different to spice up their day. These activities work well as a review or to go over older material. Additionally you can use these activities to evaluate their performance. Some ideas that I have tried were Jeopardy and Family Feud. A way to encourage participation is to offer prizes such as a homework pass.

5. You will hear a lot of opinions about homework, how much to give or not give much. Most students would agree with the former; however homework is a useful tool for monitoring, grading, and insuring that students are paying attention and doing their work. However you should be careful not only not to give too much homework but also too little. Too much homework can lead to students deciding to not do it and try to make up for it some other way. Too little homework will often lead to students neglecting their studies in order to get other work done. Homework should correspond with class work done on present day of the following day to maintain continuity.

6. Grades are an issue that will cause you headache if not handled properly. You should explain your grading methods to
your students when you take over the class with a breakdown on how much each part is worth percentage wise or point wise. You will find that your students will be demanding that they get a higher grade. By handing out a syllabus in your first class showing exactly and clearly how you are grading them you can ward off students who say that that you said something differently. This can be quite annoying but you should have their grades recorded in your plan book. You can then show they exactly where their grade came from. It is generally not recommended that any part of their grade be subjective, because it can lead to accusations of favoring some students; additionally it is harder to justify, unless you devise a system of measuring them that is accurate. You should also go over their grades with them before you submit them for two reasons, first to insure there are no mistakes, second so that they can understand how they earned their grade.

7. To evaluate your students you will eventually need to give tests. What type of test you will want to give depends on what you want to test for. A few common types are fill-in the blanks,
matching, multiple choice, essay, and short answer. Each of these is an effective way of testing knowledge but in different ways with advantages and disadvantages. Matching tests test recognition of terminology and phases; this is good for testing recognition of different concepts from among others, but since the answer is given among choices it leaves a possibility for a good guess. Multiple choice is often the favorite of students because if they don’t know the answer they a decent chance of guessing. Additionally these are the often the most difficult and time consuming type of tests to prepare; however you can often find prepared tests of this type with answer keys ready to use. Short answer questions show that the student has at least memorized the material. Essay questions usually require thought and by reading them you should be able to determine how well the student understands a topic. In addition an essay test can be used to show mastery of what they have learned.

8. In my experience I have experimented and learned many different things about teaching from labs and classroom experiences from teaching anatomy and biochemistry. When
conducting wet labs it is important for you to both to help students one on one and watch the entire class at the same time. You should also prepare yourself for the class to be more boisterous and for the students to try to goof off when you are not watching. These labs provide the students with hands on experience of what they learn abstractly in class. As in most classes you should have all the lab materials prepared and ready before class starts, so the class can get started quickly. You will notice that time seems to pass by faster then normal so plan extra time in so that the work can be completed.

Working in a computer lab presents other difficulties and opportunities. Before you take a class to a computer lab you should assess their ability to use a computer. Additionally you should familiarize yourself with the computers that they have there until you feel confident to be able to explain their usage to students. You should prepare to teach them according to their competency. This may be easier to accomplish in a one on one setting or in small groups instead of lecture. Most school have filters set on their computers prevent student from accessing
unacceptable material on the internet. By enabling your students to access in Internet you can use it to teach new discoveries and to illustrate different concepts.

When dealing with students in the classroom I found it useful to keep students on their toes, and to attempt to relate as much of the material to topics that the students were personally involved in or topics I thought they might be interested in. In my anatomy class I found that I had many people involved with sports in one way or another so I tried relating some of the material to how it would relate to them. In addition my cooperating teacher provided me with some interesting videos that talked about problems and disorders that happen when part of the human is diseased.
Conclusion:

I have been at WPI for several years and have had to make many choices about my career path. I started doing ROTC for a few years, but I found the rigidity constraining. In addition I wanted to work with kids, which wasn't much of an option in the military. Teaching offered me a way to express my creativity and work with kids. One of the most rewarding experiences involved in this project happen 2 years after I completed my student teaching. I happened to bump into one of my former students on the WPI campus this year and he remembered me. It turned out that he is now a student here. It was fun to talk about the changes in both our lives.

As you work with students have an open mind and ear. The experience you will be going through will be unique to each person. Try to learn to relax while teaching and things will turn out better.