

**Sabbatical Final Report**  
**(Sabbatical term: Fall 2018)**

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**Mathematics**

My sabbatical took place *two years* later than planned, during the fall term of 2018. I arrived in Taiwan on Sep. 3rd, 2018 and returned to Eugene on Dec. 28th, 2018. I reported at National Taiwan Normal University (NTNU) on Sep. 8th, 2018 and worked until Dec. 26th 2018. The sabbatical and my time in Taiwan proved to be a tremendous growth opportunity for me personally and professionally. In this report I will describe what I accomplished during that time in a narrative form. I will also report on the specific goals that I had planned in my sabbatical application and reflect on the experience as a whole.

Timeline of sabbatical work: Sep. 8<sup>th</sup>, 2018 to Dec. 26<sup>th</sup>, 2018

What I did:

1. Audited a graduate-level course -

I was able to audit a graduate course taught by Professor Kailin Yang titled “Mathematical Teaching Materials and Methods”, attended by 8 other graduate and Ph.D students in the math department. We met once a week for 3 hours each and the class required quite a bit of reading in English on the current trends of Mathematics Education with a focus on the topic of Statistics. The typical reading assignments every week consisted of 2 - 4 research papers by world leading authors on mathematics education, emphasizing the importance of statistical reasoning starting from a young age and the lack of inclusion of this topic in the curriculum currently in the K-12 education system in Taiwan. Students in this course took turns forming questions relevant to the readings, to be answered by all other students in the class. We also took turns making powerpoint presentations at class meetings, under the guidance and scrutiny of Professor Yang. Having left my last graduate course many years ago, the class proved to be intellectually challenging and satisfying at the same time. Students in the class are high achieving adults with many of them having middle school and high school mathematics teaching experience. In addition to being exposed to research projects done around the world and gaining a renewed sense of my own academic yearning for knowledge, the class reminded me about what it is like to be a student again. I connected with my own students on various levels; starting with the anxiety of performance expectations to the process of learning something new. The class afforded me connections to educators in Taiwan and inside views on the various education reform trends and ongoing projects. I enjoyed being a student tremendously and learned a great deal from Professor Yang and fellow classmates as a whole.

2. Helped editing a book by Professor Lin, Fulai -

Professor Lin is a world-renowned researcher and a pioneer math educator in Taiwan. He is an esteemed professor and the backbone of math department at NTNU. He has had tremendous influences on the educational policies in Taiwan and was the math department chair for many years. I was able to have a few very useful conversations with Professor Lin while providing minor editing help with his new book in process. Being a recently retired professor did not diminish his importance in the math department at NTNU nor his busy working schedule with important key players in the math education community. I felt very honored to have the access to

his expertise and knowledge in the time we spent together. Having his historical references on the developments of math education in Taiwan was unique and invaluable.

### 3. Classroom observations -

This part of my sabbatical was the most memorable and noteworthy experience. I was able to make 10 math classroom observations at various levels: 2 in elementary schools (grades 1 - 6), 3 in junior high schools (grades 7 - 9), 3 in high schools (grades 10 - 12), and 2 in college calculus courses. These experiences gave me direct and intimate access to life in a math classroom. I took many notes in each and every class on many aspects of the observations, from the physical environment, curriculum, student behaviors to teaching methods and materials, etc. I was able to take hundreds of pictures and many videos to document these experiences and to give a visual aid to share with colleagues in Eugene. Every observation was different and I felt very honored to have the opportunity to talk to teachers, students, and principals. The most heartfelt experience I had was visiting my old junior high school. It was an amazing experience to be inside of the old buildings that in my memory were much larger, to sit at the tiny wooden seat and the wooden table, and to be transported back immediately to my life as a 13 - 15 year old. The principal and administrative assistant were very gracious and kind to welcome me as their distinguished guest. They gifted me a set of math textbooks used in all 3 levels and shared my graduation yearbook that I had not seen in more than 30 years. I was able to spend some time talking to various people about the history of the school and how education has transformed since my time in Taiwan.

### 4. Interviews with teachers and professors -

I spent countless hours interviewing teachers at various grade levels and professors whom are key players in the math education system. Every classroom observation I made ended with a personal interview with the teacher. I usually presented some common questions about the individual's educational journey that led to the classroom and other topics relevant to math education development and challenges. More often than not, the teacher was equally interested in what a math classroom is like in the U.S. and the conversation flowed smoothly between learning and sharing. I also had the chance to interview a few math professors who are themselves authors of math textbooks for K - 12 in Taiwan. I also interviewed students at NTNU to learn about what the current requirements and training are for becoming a math teacher in Taiwan.

### 5. Taught a Math in English course -

Towards the 2nd half of my sabbatical, after people in the department got to know me more, I was asked to teach a course for the NTNU math students. This particular opportunity enabled me to utilize my skill set perfectly. Taiwan had just started to incorporate IB (International Baccalaureate) curriculum in some schools and NTNU was recently granted the right to offer license training program to become an IB teacher to its math education students. Although NTNU students are high achieving in mathematics and they may have some basic English skills, they lack the ability to say or teach math in English. Having taught English as a Second Language many years ago while I was living in Taiwan and being a math teacher put me in a unique position to offer a class for these future IB math teachers. I taught this class to two different groups on 8 Sundays and I was able to use the OER materials used at LCC. The students who took this class with me did not earn credit for the course, and I taught the course as a volunteer teacher. I enjoyed teaching this course immensely. I had missed teaching by this

point, and to be able to make some contribution to the math department was an opportunity that I took on happily. In my survey to the students, they reported having enjoyed the class greatly in addition to gaining skills and a boost in confidence in teaching math in English.

#### 6. Joined a Calculators in the Classroom work group -

Towards the 2nd half of my sabbatical, I was invited to join a work group led by Professor Jason Chen. Surprisingly, the math curriculum in Taiwan has not included the use of calculators (not even scientific calculators) at all levels, not even in the national entrance exams that students take for entering high school and college. Having been exposed to curriculum developments internationally, education policy makers and educators in Taiwan feel the need to include technology, particular calculators in the math curriculum. NTNU has traditionally served as the trailblazer of innovation and change in education, and Professor Chen received a grant to start the conversations and brainstorming of how to incorporate calculators in the math curriculum. The work group includes 3 junior high school and 3 high school teachers in Taipei and a supporting consultant from Texas Instrument (TI calculators are widely used across the U.S. and for years are the required calculators in the LCC math department). Once Professor Chen got to know me personally and had an idea about my professional background and experiences with technology in the classroom, he invited me to join this work group and it proved to be another opportunity for me to share ideas with math educators in Taiwan. I made connections and good friends from this group and learned a great deal from these amazing teachers.

#### 7. Presentations on Lane Community College, CC as a whole, and math education trends -

During my time at NTNU, I had the honor of making three different presentations to different audience groups on the math education developments in the U.S.. In particular, I was able to showcase Lane Community College and the role it plays in the education system and in the larger community as a whole. Community college is a foreign concept to people in Taiwan. In my powerpoint presentation I included many pictures from Eugene, Lane Community College and relevant projects and movements in math education. People were very curious and enthusiastic, and they had wide ranging questions from student populations, classroom environment, cost of education, to what do they serve in the cafeteria! In particular, they were very intrigued by the fact that students have access to a calculator starting from a very young age. These presentations were very fun for me as I had the opportunity to provide first-hand knowledge and share information to people about what it is like to learn and teach math in the U.S. I felt like an international ambassador and I was very proud to showcase what Lane Community College is!

#### 8. Travels -

During my time in Taiwan, I was able to take a one-week vacation to Vietnam and a long weekend to visit my sister in Shanghai, in addition to small weekend trips here and there locally. The location of Taiwan made traveling to Vietnam convenient and it was a wonderful trip to see the unique scenery. Thanks to the internet and modern day technology, I was able to work remotely while traveling. Time to be in nature and to visit local spots was a wonderful way for me to unwind and get my mind out of routines. I have often found renewed energy and creative ideas when I get myself out in nature or expose myself to unfamiliar surroundings. I personally could not agree more with the concept of "Travel is the best education - particular to places where people do not speak the same language." Traveling, especially overseas, are wonderful

opportunities to expand one's mind. It is a chance to self-examine our own concepts of 'right' or 'proper' way to do things and understand value systems. I felt grateful to have the opportunity to 'open' my eyes and my mind.

#### 9. Friends and Family-

This sabbatical opportunity allowed me to be in Taiwan and reconnect with my family and old friends. Although I try to travel to Taiwan yearly to visit family, my time there is usually brief and I feel like a 'visitor'. To be able to live with my family while working professionally was an invaluable time to regrow my roots in a sense. I was able to see my family and some old friends regularly and use my native tongue - Mandarin Chinese and Taiwanese. One important unplanned benefit of spending 4 months in Taiwan professionally is the new friendships I made. My time at NTNU enabled me to meet teachers and professors in the math community, and some of the conversations led to new friendships beyond working relationships. I feel tremendously fortunate to have met some amazing and dedicated teachers whom spent a great deal of time outside of their work hours to have conversations with me. Some of these collegial relationships turned into friendships; this could not have happened without the quality time I was afforded to spend in Taiwan by the sabbatical.

#### 10. Conference presentation -

I ended my last afternoon in Taiwan being the main presenter at a conference at NTNU on the use of calculators in the math classroom. I felt very honored to have been invited by Professor Chen to not just join the calculator work group, and to be the last speaker at the conference showcasing ideas on how to incorporate calculators in the curriculum. My experiences of using both scientific and graphing calculators regularly in the classroom gave the participants a chance to see the 'future' in the classroom. Ironically, just as Taiwan is about to include calculators (just scientific) in the national standard curriculum, we are moving away from requiring students to have a physical calculator in the classroom. The recent OER (Open Educational Resources) movement is a place for curiosity for the Taiwanese educators. When I talked about the cost of education (tuition and materials) of American higher education, it was often met with wide eyes and disbelief. Conversely similar reactions are met by my Lane colleagues on the cost of higher education in Taiwan. Just to give an example, tuition at NTNU (one of the most prestigious universities in Taiwan) is less than \$1000 USD (less than \$2000 for non-Taiwanese students) for one semester (it is a two semesters per year system). A calculus textbook at NTNU, brand new, is roughly \$25 USD. Let me clarify: the textbook is in English and is published by the American publishing company *Cengage*. In the math department we have used many Cengage textbooks, and they cost more than \$100 USD each to the students. It does not take long for one to wonder, "Why does education cost so much in the U.S.!!?"

What I gained:

Professionally -

The goals that I have laid out in my original sabbatical proposal focused mainly on learning how to teach mathematics from a language approach. This goal in the end turns out to be surpassed by other gains I achieved through the experience. Spending time in Taiwan, immersed in Mandarin Chinese, undoubtedly gave me the opportunity to compare and contrast the learning and teaching of mathematics in the two cultures. I learned first-hand the struggles presented by each language

when it comes to learning mathematics from the perspectives of students. This experience naturally will help improve my teaching approach in the classroom.

In addition, as a result of spending a long period of time directly in the classroom and in the education system, I gained a wealth of knowledge on the focus and trends of math education in Taiwan. I believe seeing different ways to doing the same thing is the best way to learn how to improve. Seeing how Taiwanese students have not been exposed to calculator use in the classroom and their high achievements is a testimony to why so many American students struggle with the basics.

The many interviews I conducted with teachers and students exposed me to numerous new ideas to teaching. I want to move my career forward with a new emphasis on connecting with colleagues on the learning and teaching of mathematics. I see personally the benefits of having opportunities to immerse in regular conversations and we need to create more informal and formal opportunities for sharing ideas.

Being a student in the graduate level course as well as sitting in on a college level calculus course was a good opportunity for me to learn ‘how to learn’ again. It put me right in the seat of our students and it allowed me to see teaching from a different perspective.

The time I spent at NTNU supplied me valuable opportunities to connect with math educators internationally. I was able to meet many key players of the education policy makers in Taiwan and learned the intricacy of a large education system and its inner connections. I was humbled by the hard work of many professors at NTNU, by the amount of time and energy they spent to invest in their students and to contribute to the larger educational system as a whole. Many professors I met share the sense of ‘public servant’ in their role as teachers and they often devote their life time to educate the future. The tenacity I see in many teachers in Taiwan left me with a profound sense of duty.

One very fun goal I achieved during my sabbatical is being the ‘international ambassador’ of Lane Community College, as I described earlier. In the presentations I gave, I showed slides of student population, Lane campus, math classroom, and many other aspects of a community college life. The reaction and feedback I received from these presentations were always positive and enthusiastic. It is a great feeling to know that the audience was learning something new and exciting. The experience reminds me of the importance of being curious and the art of listening and asking questions. The easiest way to connect with someone new is by asking questions about them. I feel that my time at NTNU would have made Lane Community College proud.

Personally -

When I first arrived at NTNU in early September 2018, the school year was about to start in Taiwan and the campus was quiet. I had stayed in contact with professor Jason Chen, whom sent me the original invitation letter in my sabbatical application more than two years ago, and he approved the delayed visit and welcomed me via email to the department. I was directed to get in touch with the administration assistant in the department upon arrival to arrange the details of my stay. During this initial time, I felt isolated, disoriented and lost; like an orphan not sure who was in charge of me or what my role was. Professors at the university were not on campus yet, and the math department staff seemed puzzled as my role there. It took me more than two weeks to understand what was going on. Professor Chen was the department chair at the time of my sabbatical application and he would have been my mentor and the facilitator for meeting the other professors in the department. This would have been a crucial and tremendously helpful step in the academic hierarchy system in Taiwan. Due to the two-year delay in taking my sabbatical,

the department chair had changed and I became a minor detail among many administration businesses and responsibilities that got lost in the transition process. On top of that, Professor Chen was abroad when I arrived and as soon as school started every professor was occupied with getting ready for the new school year.

I struggled in the first month trying to connect with others. I knocked on many professors' doors and to introduce myself to others. Culturally taking initiatives and being independent without someone well known to introduce me was not always viewed positively. It took a lot of hard work and perseverance to show people my genuine interest in learning so they would open their office doors and spend time with me for conversations and interviews. It took time for others to get to know my strengths and experiences as a math educator, and I had to keep showing up with a positive attitude for people to realize that I too have a lot to contribute. I learned to say "Yes!" to opportunities that came my way and to push through difficult times without hiding myself in a corner. Looking back at this time, I can't help but be marveled at the 'beauty in the struggle' that life presents to us at times. I was very humbled by the experience and it helped me grow tremendously. The administrative support staff person, Chi-Tai (Bruce), whom I first had contact with upon my arrival at NTNU ended up being a very dear and close friend to me.

In conclusion, I am immensely grateful for the sabbatical experience granted by the FPD committee. As a result of my departure from LCC, I will not be able to share my experience with the larger Lane community at the fall inservice and for that I'm regretful. I am very glad to have the opportunity to share my experience with my math colleagues in early June before the school year ended. The presentation was 30 minutes long, but I could have used 2 hours to talk about everything I did and learned! Although pictures don't do justice, I'd like to share a glimpse of my sabbatical from the large archives of pictures and videos of my time spent in Taiwan.

Link to my sabbatical presentation for the LCC math division:

[https://docs.google.com/presentation/d/1OyGd0pmsIqxl-K7ZP7iCrus6MRfhVSk53lg-O\\_oTFjM/edit?usp=sharing](https://docs.google.com/presentation/d/1OyGd0pmsIqxl-K7ZP7iCrus6MRfhVSk53lg-O_oTFjM/edit?usp=sharing)

Link to my presentation at the Calculator conference on Dec. 26th, 2018 at NTNU:

<https://docs.google.com/presentation/d/14TDl4g8Lac3UuqcFqLwHnT2mryffs0Kq7zTX6IHFRl4/edit?usp=sharing>