Faculty Professional Development

Application for Paid Sabbatical

CONTENTS

PART 1: GUIDELINES AND CRITERIA

Please retain these for your own records.

Please thoroughly review the guidelines and criteria listed below before completing this application. Incomplete applications will not be reviewed. Faculty Professional Development (FPD) offers support in completing your application. Please contact the Faculty Professional Development Coordinator for details.

Paid Sabbaticals are competitive grants awarded each Winter term to contracted, permanent Lane faculty members. Sabbaticals are a paid opportunity intended to strengthen and deepen your role as a professional in your discipline and to provide an opportunity to grow and develop as a faculty member at the college. Faculty can apply for one or more terms of leave, and, if awarded, their positions are backfilled by part-time instructors. Most award recipients receive one term of sabbatical leave, but if circumstances warrant it and funds are available, faculty may be awarded two or three terms of leave; however, awards of more than one term are rare. Please refer to **Article 23.8** of the Faculty Contract for additional details on sabbatical awards.

Applicants must meet all criteria listed below:

1. Employee must be a contracted, permanent faculty member and have worked at the college for at least 2 years. Employees with 2 years of service are eligible to apply for 1 term of leave; employees with 4 years of service may apply for up to 2 terms of leave; and employees with 6 years of service may apply for up to 3 terms of leave.
    a. Note: Leave award is calculated on present contracted salary, not on projected or scheduled overloads above contracted salary level. An employee who takes one term of leave receives full salary for the year. An employee who takes 2 terms of leave receives 87% of annual salary for the two terms of leave and the normal salary for the third term. An employee who takes 3 terms of leave receives 75 % of annual salary for the year. *Example:* an employee who normally grosses $60,000 per year and who takes 2 terms of leave will receive a gross of approximately $54,800 (.87 * 20k, + .87 * 20k, + 1.00 * 20k).

2. A paid sabbatical is designed for projects and activities, which the employee cannot accomplish during contracted time. A paid sabbatical generally means an off-campus experience.

3. If the goals or activities of the leave are altered, or a postponement is required, the recipient shall notify the committee in writing immediately, and the committee must approve all changes before the work continues. Each request will be reviewed, and applicants will be notified in writing of the committee's decision in a timely manner.

4. Upon completion of sabbatical leave, the recipient must return to LCC for a minimum of one term per term of leave taken. If the recipient does not return to LCC, or does not complete the leave as approved, he/she must repay to the college the portion approved, plus actual OPE.

5. The recipient shall complete both an oral and a written report of the leave activities. The oral report will be scheduled during the Fall In-service immediately following the leave term. The written report shall be submitted in electronic form (Word document or PDF) no later than the date of Fall In-service when the oral report is given. Written reports will be published on the FPD website and filed

with the appropriate Vice President. Additional guidelines for the reports are listed at the end of this section under 'Requirements'.

6. In order to be eligible for a second or third sabbatical award, the faculty member must have completed all requirements, including both the oral and written reports, for all previous paid sabbatical leaves. Failure to do so will result in the ineligibility for future awards. *Note: It is highly recommended that you keep both an electronic and hard copy file of your sabbatical reports for your own records.*

7. All applications must be complete. The application must be typed, have all appropriate signatures, include all requested information, and have sufficient supporting documentation, including acceptance letters, school schedules, etc. Responses to questions in the application should be clear, detailed, and thorough. Model applications are available online. The committee will not review incomplete applications.

8. Applications must be received by the Faculty Professional Development office via email (fpd@lanecc.edu) by the deadline. Late applications will not be accepted. The annual deadline for submission is posted at http://www.lanecc.edu/fpd/grants/sabbatical-long-term-leave-paid.

Restrictions:

- A paid sabbatical is not intended to be used for the writing or production of materials for classroom use (i.e. curriculum development). We realize that research/projects may result in the need for curriculum development. Curriculum development funds are usually accessed through the unit planning process.

- A paid sabbatical cannot be for personal business interests outside of college employment.

- A paid sabbatical cannot be used for immediate, direct, or indirect financial gain.

- No faculty member on leave shall receive a combined income (development leave award plus possible outside income) amounting to more than 100% of his/her contracted salary. Tuition, fee grants, and scholarships shall not be considered additional salary.

- No faculty member on leave will teach at LCC during his/her paid sabbatical.

NOTE: Please refer to Article 18 of the Faculty Contract for more information on patents, inventions, copyrights, intellectual property rights and use of college equipment.

Appeal Process: Applicants have the right to an appeals process. Please contact the Executive Board of LCCEA.

Requirements:

Written report (due by no later than the Fall In-service after the term of leave): Please submit your report as a Word or PDF document (typed, formatted to your choice of standards, including a cover page with your name, the title of your presentation and the term/date of your sabbatical project) attached to an

email to the Faculty Professional Development Coordinator. Please keep a printed copy in addition to your electronic files for your own records.

Written reports should, at a minimum, include:

- An introduction that includes a summary of the purpose, goals, and objectives of your project.
- A discussion of the methods and/or processes you used to complete your project. This is where you provide the details of what occurred during your project. Please note any changes you had to make from your original action plan in your proposal.
- A description of the results and/or outcomes of your project. Please include any supporting documents, creative works, or products that you feel are relevant to the outcomes.
- A final reflection on the significance of this project to your work at Lane, to your Division, to the College as a whole and to your discipline.

Reports deemed to be insufficient will be returned to the faculty member for revisions and re-submission. Final reports will be filed with the Sabbatical Committee and the appropriate vice president and will also be published online and available to the public on the Faculty Professional Development website.

Oral presentation: An oral presentation is required and is given during Fall In-service following the term of leave. Presentation time is limited (typically 15-20 minutes per presenter), so oral presentations should summarize sabbatical activities and professional growth, drawing applications for the broader campus community. All college employees will be invited to attend the oral reports, and all reports should exemplify professionalism and clearly demonstrate a worthwhile use of professional development funding. More details on location, the specific date, and time of your presentation will be emailed to you late in the summer.

Please note: Both the oral and written reports are required elements of the sabbatical activity. Future sabbatical applications will not be considered if these two reports have not been completed.

Dissemination of Information Gained: In addition to the required oral and written reports, you will be encouraged to choose additional ways in which you plan to share your sabbatical findings and information gained. Please contact the Faculty Professional Development Coordinator if you would like assistance in arranging an extended department report or an academic colloquium (Academic Colloquia Application).

Additional Funding Sources: Professional Activities Funding: If you have funds left in your rolling three-year Professional Activities (Short Term Leave) balance, you may apply separately to the Professional Activities committee to cover sabbatical related travel expenses. **Please remember that you must apply for funding for travel in advance.**

PART 2: APPLICANT INFORMATION AND SIGNED APPLICANT STATEMENT

Submit Parts 2-4 electronically.

Completing your Application: After reading through **Part 1**, please **complete Parts 2-3 and have your Division Dean complete Part 4.** These sections, along with any supporting documentation should be submitted in electronic format (Word document or PDF) by email to: fpd@lanecc.edu. Please retain hard copies and electronic copies of all documents for your own records.

Note: Model proposals are available online, and mentors are available on request.

Applicant Information (please type in the form below):

Name: Berri Hsiao **Department/Division: Mathematics**

Ext.: 5397 **Email address: hsiaob@lanecc.edu**

FTE: 1.0 **Home Phone: 541-554-9122**

Years at Lane under contract: 7 (entering 8th year)

Previous paid sabbatical leave dates (if applicable): NA

# of terms of paid sabbatical leave awarded in the past: NA

Sabbatical Project Title: Teaching and Learning Mathematics using Language Approach

Term(s) requested for leave: 1

Leave Location(s): Taipei, Taiwan

Applicant Statement:

I have read the guidelines and criteria for sabbatical leave, and I understand them. If accepted, I agree to complete the sabbatical project as described in my application as well as the written and oral reports. I understand that I will not be granted a sabbatical in the future if I do not follow these guidelines and complete the oral and written reports. (The committee recognizes that there may be minor changes to the timeline and your proposed plan.)

Applicant signature: Berri Hsiao Date: 01/26/2016

PART 3: SABBATICAL DETAILS (LEAVE INFORMATION)

Please clearly identify each of the following sections in the narrative of your application.

Application questions and criteria for selection: Following the format outlined below, please address each of required sections. Reponses should be well organized, thorough, and clear. Criteria for evaluation are listed below each section.

Required Sections

1. **Intent and Plan**- Outline what you intend to do if granted this leave. Be sure to include a detailed explanation of your goals, purpose, and any research objectives if your project has a research focus. To the best of your ability at this time, please describe your plan and explain what you would like to accomplish in detail. Please be specific and include details of proposed activities and itineraries for the entire leave time, timelines, appointments, etc. You may include information about any preparation you have done or will do prior to your proposed leave. (We understand that some details of the timeline and your proposed plan may change.)

   Note: In order to award sabbaticals to the greatest number of faculty members, the committee encourages one-term leaves. If you are asking for more than one term, please justify the need for this in your application. **(30 points)**

   Criteria for evaluation:
   - Description of:
   - The goals of the proposed sabbatical
   - Any research objectives if the project has a research focus
   - Details of proposed activities and itineraries (week by week)
   - Timelines, timetables, appointments, specificity

I intend to use my fall term 2016 sabbatical, if granted, to research math education in Taiwan and how language affects the teaching and learning of mathematics. I will be working closely with the Taiwan Normal University's mathematics teacher-training program (which resides in the Department of Mathematics). This exciting opportunity will allow me to observe closely the process for becoming a math teacher in another country, to learn the math curriculum, as well as to spend time in the actual classrooms of the students' K – 12 practicums. Additionally, I will be observing regular math classes at the university level, as well as at the K – 12 levels, in order to broaden my understanding of various aspects of math education: curriculum, in-service training opportunities for teachers, and teaching strategies and styles. Lastly, my sabbatical project will incorporate interviews with various members in the math community: teachers of future teachers, prospective math teachers, current math teachers at the different levels, and the current math students. I have three main goals in mind for this research project and will provide details and background information below.

Goal #1: ***To review existing research on the topics of improving math teaching and cross-culture studies of math education***

Undoubtedly math education has changed a lot over the years nationally and globally, and there has been a tremendous amount of research written on the topics that I am hoping to investigate personally. I strive to remain current on my professional knowledge with regard to community college instruction in general, and more specifically to the specialty area of mathematics instruction. I do this through reading relevant articles and attending conferences and other professional development events, as time allows. However, because I take my responsibilities as a full time faculty member very seriously, I find that I have limited time to pursue all of the knowledge that I would like to discover and learn more about. The freedom from normal job duties that a sabbatical provides would create an ideal opportunity for me to discover and examine existing research that will help to guide and shape my project.

Gaining knowledge and exposing oneself to different pedagogy and perspectives lies at the heart of a liberal arts education, which is the foundation of what we hope our students will achieve through their experience here at Lane. As soon as my teaching duties end in June, I will devote additional time to reading existing research on math education and cross-cultural studies of curriculum and math performances. This is an important process that will enrich my knowledge as well as guide my project. I will continue reading throughout the duration of the sabbatical. A tentative reading list is provided at the end of this application.

Goal #2: ***To compare and contrast math education in Taiwan and in the U.S.***

Background –
My first master's degree is in mathematics education and I taught math at the high school level before coming to Lane and earning my second master's degree (in mathematics). In addition to observing and helping in my own children's math classrooms at various stages, I have also volunteered as a math teacher for advanced math students in a local elementary school. Over the years, I have participated in projects, and in statewide and national conferences directly tied to math achievement and improving math education. Needless to say, I have a deep-rooted interest in trying to understand why students in the U.S. are often outperformed by students in other developed (and some developing) countries, how to improve teaching of math, and most importantly, how to improve student learning in the area of math.

Having been born, raised, and educated through grade 12 in Taiwan, I naturally compare and contrast US math education with what I remember from my own experiences. One of the many differences between the two math education systems is that in Taiwan, math is taught by what we call math specialists starting at a lower grade level than in the U.S. Math specialists are typically people who have a bachelor's degree in mathematics. After passing rigorous national testing to get into one of the few teaching programs, they are trained for two years specifically in teaching math (including practicum teaching) before they teach in a classroom themselves. In recent years, I have visited and observed the Taiwanese math classrooms of my elementary school aged nieces. A lot has changed in classrooms since my time and numerous national reforms have taken place over the years. The sabbatical will give me the opportunity to examine closely the differences and similarities of the two countries' math education systems in many areas, beyond simply examining the math curriculum, training backgrounds of math teachers, and the relationship between teaching and learning of mathematics in Taiwan. I hope

to gain some insights into the attitudes towards math in teachers as well as in students, and to examine any cultural differences such as how the profession of teaching is perceived.

Among the readings I have done over the years on math education, "*Knowing and Teaching Elementary Mathematics*" by Liping Ma influences the foundation of my research the most. Liping Ma is a Chinese born educator who did an in-depth comparison study of math teachers in China and in America. Her study described the process in which a teacher's own understanding of mathematics affects the teaching of materials to the students. Most interestingly, the way in which teachers learned the math themselves shapes the way that they explain math concepts to their students, especially when their students encounter misunderstanding or difficulties. In addition to observing in their classrooms, Ma provided math teachers in both countries with examples of student math work and asked these teachers to explain the mistakes students have made; how they might explain the misconceptions to the students; and what methods they would use to help the students understand the concepts better. This book for several years was used as a required reading for students majoring in Education and taking the Math 211 – 213 sequence (Fundamentals of Elementary Mathematics) at the University of Oregon, as well as here at Lane. I have taught this three-term sequence several times at both institutions and the use of Ma's book has proved to be illuminating for both my students and myself. The reading and writing assignments of my own students provided me insight into the history, general weakness of math knowledge, and the attitudes towards math learning of the Education students. Although the students in this course sequence are mostly prospective elementary and middle school teachers, the general math population that I teach at Lane shares the common narratives in math learning: the failure of their math teachers' to explain the 'why's' behind concepts, the gaps in their own math knowledge, the lack of underlying confidence in the subject matter, and the lament that math teachers are not able to make the subject more interesting and relevant. One interesting thing that I have observed over the years is that math educators in general share their students' dissatisfaction of not being able to understand math at a deeper level, let alone appreciate the art of mathematics! So in a way, there is a cycle of poor teaching and poor learning on the parts of both students and teachers.

One of the more recent articles featured in the New York Times by Elizabeth Green, titled "*Why Do Americans Stink at Math*", attempts to answer questions as to why American students perform less well and why education reforms in math often fail in the U.S. The article tells the story of a Japanese teacher Akihiko Takahashi who, like me, was educated under a very different education system (in Japan) before coming to the U.S. to train as a math teacher. In addition to discussing the deficiencies in the way problem solving is taught in the U.S., Mr. Takahashi focuses on one major difference between the two countries: the amount of time available to math teachers, facilitated by schools, to collaborate on lesson planning and to engage in pedagogical discussion and exploration. My teaching experiences at the different levels in the U.S. echo Mr. Takahashi's observations. This is true at the K through 12 levels, where not enough regularly scheduled in-service training is used for pedagogical discussions among colleagues, and is even more pronounced in the higher education setting. As instructors at the community college level, we do have opportunities to attend conferences to gain useful tools for our teaching toolbox. However, I believe there is not enough regular support for teachers to learn and perfect the art of teaching. At a basic environmental design level, the K through 12 work space for teachers is more like desks arranged in a large common room that allows some natural opportunities for collegial discussions as to compared to the individual office setting that we have at the college level. Community college teachers have expertise in a particular subject matter and most learn how to teach on the job itself, with not enough time or opportunities devoted to regular learning and honing of actual

teaching skills from other instructors. On my sabbatical, I will have the chance to observe all these aspects of math education described thus far and expose myself to different ways of teaching and learning math. I expect to gain a great number of ideas to bring back to my own teaching and will be able to share what I learn with my colleagues, and hopefully with the wider math community as a whole.

Working with the Taiwan Normal University is an honored and exciting opportunity for me. With the support of the FPD program, I will be able to devote concentrated time and energy to learn about many aspects of the math education system in Taiwan. I will be working with the faculty, students, and administration in the teacher-training program for mathematics in two ways:

i) I will spend time with the program administrators and faculty to learn about the curriculum in the program, the exit and entrance requirements for prospective math teachers of various levels, to observe integral math education related classes for the pre-service mathematics teachers and to conduct interviews with faculty and students. I plan to observe classes of 3 to 5 faculty weekly, divided by the levels of mathematics these students will be teaching in the future. I will record my observations by taking notes and pictures, and videotaping (with permission) the classes. I will be paying particular attention to the class demographics, teaching and learning environment, teaching tools and pedagogies, and institutional support systems for pre-service teachers.

ii) I will shadow second year students in the Teacher-Training program (the pre-service teachers in practicum), divided into the 3 major levels of mathematics in Taiwan, in two-week intervals. Special attention will be paid in the areas of curriculum design, collaboration between pre-service teachers and mentor teachers, institutional support system for teachers, physical and emotional learning environments for mathematics education, interviewing with the students and teachers, and videotaping (with permission) of classrooms. I also hope to have the opportunity to better understand the support system for students struggling with math concepts at school and at home, by seeking opportunities to talk to parents.

Having the most prestigious and rigorous teacher training program, Taiwan Normal University has traditionally played an integral role in guiding and influencing education policies and reforms. Working with faculty who have insightful knowledge on the history and policymaking of mathematics education in Taiwan will be a potential added bonus; learning about this broader topic will help me understand the impact that various reforms and policies have on math education.

Goal #3 – *To research math teaching/learning from a language approach*

Background –
I worked as an English as a Second Language teacher for elementary and junior high school students in Taiwan for several years before I moved to Oregon. Although my formal public education was in Mandarin Chinese, the course work for my undergraduate degree and two master's degrees were in English. These experiences of English learning and math learning in two very different languages over the years have provided me with the ability to see math as a language from a unique perspective. In my days as a student in Taiwan, formal English education started at 7th grade with 3 to 5 hours of instruction per week in public schools. In this system, students spend a majority of their time memorizing and regurgitating vocabulary, grammar, and learning sentences in an artificial setting. It is not surprising that this mode of teaching a second language did not result in much real-life speaking or listening

experience outside of school. Conversely, when we learn our first language, it is done via the immersion experience. We simply "pick up" on the meanings and usage rules, but may not have adequate skills with written communication. I believe that to really have proficiency in a language, including mathematics, we need both: we need an intuitive understanding as well as specific technical knowledge. The idea that math is a language (a universal one at that!) is widely accepted. Just as in other languages, math is context oriented and full of exceptions in its usage. However, I came to realize through my experience over the years as a student and as a teacher that we do not teach math using a language approach.

While growing up in Taiwan, I was tested and identified as an average math student. Like most girls, I never thought of myself as being particularly talented in math and was not encouraged to go into math or science due to my gender. When I first came to the U.S. and started taking college level math in English I was often confused, as are most math students, about what various terms mean in math. I assumed all the other native speakers must know the math vocabulary such as "simplify", "factor", "combine like terms" or "solve". Interestingly enough, unlike American students (who might believe that not understanding math vocabulary and concepts is a result of their inability to do math), I simply thought that I just did not understand English. In retrospect, I believe this internal reasoning and processing afforded me an advantage in learning math. It is true that Taiwanese students seem to have a stronger foundation in general than their American counterparts, but without this extra layer of self-doubt in my ability to do math, I simply tried to understand math-related English better by paying more attention to the precise definitions of vocabulary, the structures, and the reasoning behind math structures.

Throughout my teaching career, like most math teachers, I have been consistently struck by the low math performance of students and their negative perceptions of math learning. I have had countless conversations with math colleagues, formally and informally, on trying to understand why so many students, including those here at Lane, need to take developmental math despite having graduated from high school, and why so many students fail in math. It is heartbreaking to see math as a major roadblock to many students in achieving their goals, and it is a continuing journey for me to search for creative and useful ways to help my students.

One insight I have gained over time is that math educators often see students' mistakes in math as an indication of failure in prior learning/teaching and sometimes come to the conclusion that students are just bad at math. Reflecting on my earlier experience as a math student in the U.S., I began to wonder if my students would benefit and learn better if I infused math teaching with attention to the language structure of math. I started to assess common mistakes and misconceptions made by students that could be 'horror stories' for math teachers and try to see these mistakes from the eyes of a student who is learning a foreign language. I look for ways to provide my students with examples in English that are natural to the students but not natural to me, as a non-native English speaker, while they are learning something in math that is non-intuitive and difficult. Over time, I have found that this approach to teaching math from a language approach has proven to be helpful to students, not just in understanding math symbols and structures, but most importantly, it has positive impact in their experience of math learning. A few years ago I gave a talk on this topic at the ORMATYC (Oregon Mathematical Association of Two Year Colleges) and received favorable and encouraging feedback from fellow math educators. Since there is not the time and space to reproduce my talk here, I would like to provide a few examples of how I use this approach in my teaching. I regularly incorporate common mistakes and

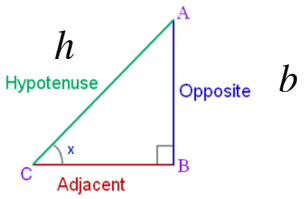
misconceptions that are appropriate for the particular student population in a class and use similar analogies in English to help them understand the language of math.

Example 1: Math is language of shorthand notations!

Student mistakes: I) $\frac{\sin x}{\cos x} = \frac{in}{co}$ II) $\frac{12!}{12} = !$ III) $-|-3| = 3$

Explanations –

I) $\sin(x)$ is the shorthand notation for saying: given a right triangle, the ratio of the length of the side opposite of the angle x and the length of the hypotenuse. Please see the figure below. So ***sin*** only makes sense if we have an angle to discuss like *sin* 60^0 (read as sine of 60 degrees). It makes sense that students might make a mistake like above as we often use letters to represent variables and students are told that if they don't see a math operation between two things, it means a multiplication as in $4x$ or $4(x)$ is assumed to be $4 \cdot (x)$ or $4 \times (x)$ (and this leads to another confusing thing about math, we use different symbols to mean the same thing. English has a lot more!)



$\sin x = \frac{b}{h}$

II) The symbol ***!*** (read as factorial) is the shorthand notation that says: the product of a number and all of its consecutive decreasing natural numbers. Example: $6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$ Therefore, ***!*** by itself does not mean anything.

III) The symbol with the two short bars around a number is read as "the absolute value" and it is a short phrase to saying this long sentence: the distance between a given number and the number 0 on the real number line.

So $|-3| = 3$ because the number -3, on the number line, is 3 units away from 0. Hence $-|-3| = -3$. It is understandable why this is so confusing to students as it is similar to parentheses and yet they have very different results, as $-(-3) = 3$.

I point out to my students often that many math symbols were created as ways to write very long sentences (definitions) using short and simple notation. The symbols often have Latin roots and/or were named by mathematicians. I try to provide brief historic background whenever I can because I believe a story helps the students learn better. This way of shorthand writing is clever and useful as it is simple, elegant, and it saves us a lot of time when we need to discuss something. Instead of assuming that students should understand the meaning of the symbols, I see it from the perspective of learning a second language – it makes sense that students might be confused. A good analogy is the usage of slang in English, which sometimes has a very different meaning than an English learner might think.

Example 2: Math is a language full of exceptions and inconsistency!

I) $Sin^2 x = (\sin x)^2$ but $\sin^{-1} x \neq (\sin x)^{-1}$. In actuality, $\sin^{-1} x = \arcsin(x)$ which means the inverse function of x

II) $4x = 4 \cdot x$ but $4\frac{1}{3} \neq 4 \cdot \frac{1}{3} \quad \Rightarrow \quad 4\frac{1}{3} = 4 + \frac{1}{3}$

III) $4\frac{1}{3} = 4 + \frac{1}{3}$ but $-4\frac{1}{3} \neq -4 + \frac{1}{3} \quad \Rightarrow \quad -4\frac{1}{3} = -(4 + \frac{1}{3})$

There are many examples than presented and there are just as many exceptions in the English language. I often take a few moments to share with my students some examples in English that seem very strange from the perspective of a nonnative speaker such as myself. For example, one says "turn the light off " when the light is on, but we say "turn the alarm *off* when the alarm goes *off*"!

Example 3: Math is a context-oriented language

In math a letter is often used as a variable for an unknown quantity. Students are used to solving an equation for a particular variable, such as:

$$4x = 12$$
$$\frac{4x}{4} = \frac{12}{4}$$
$$x = 3$$

Therefore, it is understandable why students might make the following mistake that could lead to a teacher to assume that students do not understand the math concept.
Question: Given $f(x) = x + 6$. Evaluate $f(3)$

$$f(3) = 3 + 6$$
$$f(3) = 9$$
$$\frac{f(3)}{3} = \frac{9}{3}$$
$$f = 3$$

In the above example, the context is crucial to understand: that as soon as one sees $f(x) = x + 6$, we are talking about a function called *f* and, therefore, *f* is not a variable in the equation. It is just a name for this function, similar to having a brand name called "Apple" that has nothing to do with the fruit. Yet context is something that we don't spend enough time teaching the students to notice. Most languages are context oriented and we often need to pay attention to the particular context to use the language properly.

Being in Taiwan and studying math education in another language under the conditions supported by a sabbatical, I trust, will benefit me substantially in gaining more awareness and appreciation of what learning mathematics is like for non-native math speakers, such as my students. Students in Taiwan learn math as a second language like American students and I am curious how Taiwanese students view the language of math. As teachers we can lose track of what is difficult for students and why. It is valuable and beneficial to the students for us to be able to see the struggles through their eyes. Besides Mandarin Chinese, I also speak the predominant native dialect Taiwanese (which is completely different than Mandarin). With my background, I think that I am particularly well-equipped to do this research in Taiwan. I have been in contact with several educational institutions in Taiwan in the past, and I am honored to have received a formal invitation from Taiwan Normal University – one of the most prestigious universities in Taiwan. I have visited Taiwan many times, and in recent years I have also visited my young nieces' elementary math classrooms and discussed math education with the math teachers at the school. The teachers have welcomed me to visit the classrooms again at any time and they are eager to discuss and exchange ideas about math education with a person who teaches math in the U.S. I plan to augment my main research at Taiwan Normal University with some more classroom visits at my nieces' school.

An added bonus of doing my research in Taiwan is the opportunity to examine more closely whether the language in which a student learns math affects the learning of math, itself. Research has shown that perhaps certain language structures are more conducive to math learning than others. Math is a base ten (mostly) system where there are ten distinct symbols for all our numerals, i.e. {0, 1, 2, …9}. Each place value is based on powers of ten and regrouping is required every time we have groups of ten(s). One way to demonstrate the importance of this unique math structure is to look at the following number:

2 0 1 2 3 8

The symbols used here -- *0 1 2 3 8* all have distinct meanings depending on where they are placed. Imagine if we just write these symbols slightly out of order:

1 0 2 8 2 3

This number would be completely different than the previous one and it is the result of the place values. Picture the symbol *2* – it appears twice yet the same symbol has completely different values!

One of the reasons that English is viewed by some as a language more difficult than, say Mandarin Chinese, in which to learn math is that numbers in English are not based ten. That is, the way that numbers are said in English: "one (1), two (2), three (3), …, ten (10), eleven (11), twelve (12), thirteen (13), fourteen (14), …" is a strange one for someone like me whose first language is not English. In Mandarin Chinese, the way numbers are said and counted is more aligned with the base ten system in math. We say (in translations): "one (1), two (2), three (3), …, ten (10) , ten-one (11), ten-two (12), …, two tens (20), two tens one (21), …" Mandarin Chinese also give more distinct names than English for the place values used in math. The number 21300 is read in English as "twenty one thousand and three hundred", where as in Chinese, it is read as "two **ten-thousand**, one thousand, and three hundred." where we have a specific name for the place value 10,000. There are other ways that math is structured more as a distinct language in Chinese than English. For example, words for the math operation "multiply" and "exponent" are distinctly used only in a math context, where as in English one might say 'product of' or 'times' in which the words themselves have other meanings in different contexts. I believe the opportunity to immerse myself in math education using a language other than English will give me more insights into the struggle students encounter when they try to learn math. Seeing the

differences and similarities of math learning in the two languages will give me more ways to incorporate this language teaching approach in my math classrooms.

In observing the classrooms of the teacher-training program at Taiwan Normal University, the practicum classrooms of pre-service teachers at the 3 different levels, and the college level math classes (see timeline below), I will have the perfect opportunity to immerse myself in math using Mandarin Chinese and observe more objectively the structure and the usage of a language in the context of learning and teaching mathematics. I will be paying close attention for ways in the Mandarin Chinese structures that might be disadvantageous or advantageous for learning math. Through mindful observation, I hope to gather examples of if and when math is taught using the language approach in Taiwan, and compare and contrast it with what is done in the U.S. In addition, I will be looking for differences and similarities between teaching methods and the effects of these methods on student learning experiences. The observations will no doubt generate more questions for follow up interviews with the teachers and students. I believe collaboration and discussions with Taiwanese teachers on these topics from the U.S. perspective will naturally arise as well.

Timeline –

The Taiwan school system is semester based and starts in the beginning of September. The K through 12 levels usually start classes in the first week of September, and the university level starts classes in the second week of September. I will divide my time to focus on each of the three areas of math education: elementary school level, junior high school level, and high school level. The high school level math curriculum covers up to the equivalent of some of the 200-level math classes here at Lane. I will also spend some time observing in college level math classes (focusing on the 100 to 200 levels). Due to the early submission of the sabbatical, I do not have details such as the names of the individuals that I will be interviewing or the names of the schools where I will be shadowing the pre-service practicum teachers. Although the teacher-training program does not have the detailed fall 2016 class schedule out yet, the department head and the administration have welcomed me fully, to aid me in my research.

Spring 2016 through summer of 2016—

- Read existing research
- Continue correspondence with Taiwan Normal University to communicate logistical details for my visit
- Gather more student samples and current math curriculum information from my teaching to share with colleagues in Taiwan
- Discuss details of my project with Lane colleagues, gathering their inputs for interview questions
- Continue writing interview questions
- Finalize travel plans

Mid to the end of August 2016 --

- Travel to Taiwan and settle in
- Initial in-person visit to Taiwan Normal University to finalize office arrangement and meeting available colleagues and administrative staff in the Teaching Training program
- Finalize interview questions and making adjustments to observation schedules

Week 1 (Sep. 5th—9th) (roughly 30 -- 35 hours)

- Attend and observe orientation trainings for new students entering the teaching training program
- Attend and observe orientation trainings for new faculty in the teaching training program
- Attend curriculum planning and department in-service meetings
- Interviews with the department head of the teacher training program and faculty
- Review and reading of curriculum for the teaching training program
- Finalize plans for visitations and shadowing pre-service teachers at the various through 12 level schools
- Read existing research, compile notes and journaling

Week 2--4 (Sep. 12th – 30th) Elementary School Level

- Spend roughly 10 hours per week observing in classrooms for future elementary school teachers, including math instruction and pedagogy instruction
- Spend roughly 10 hours per week observing in elementary school classrooms for second-year practicum students in the program
- Spend roughly 5 hours per week interviewing students and teachers
- Spend roughly 5 – 10 hours per week reading existing research, compiling notes, journaling, and making needed adjustments to research

Week 5 --7 (Oct. 3rd – Oct. 21st) Junior High School Level

- Spend roughly 10 hours per week observing in classrooms for future junior high school teachers, including math instruction and pedagogy instruction
- Spend roughly 10 hours per week observing in junior high school classrooms for second-year practicum students in the program
- Spend roughly 5 hours per week interviewing students and teachers
- Spend roughly 5 – 10 hours per week reading existing research, compiling notes, journaling, and making needed adjustments to research

Week 8 --10 (Oct. 24th through Nov. 11th) High School Level

- Spend roughly 10 hours per week observing in classrooms for future high school teachers including math instruction and pedagogy instruction
- Spend roughly 5 - 10 hours per week observing in high school classrooms for second-year practicum students in the program
- Spend roughly 5 hours per week interviewing students and teachers
- Spend roughly 5 – 10 hours per week reading existing research, compiling notes, journaling, and making needed adjustments to research

Week 11 (Nov. 14th – Nov. 18th)

- Spend 8 – 12 hours observing in college level math classes
- Spend roughly 5 hours per week interviewing students and faculty
- Spend roughly 5 – 10 hours reading existing research, compiling notes and journaling

Week 12 (Nov. 21st – Nov. 25th)

- Follow up on interviews if necessary and wrap up work at Taiwan Normal University including appreciation rounds to involved parties
- Spend roughly 10 – 20 hours compiling and finalizing notes
- Prepare for return trip to the U.S.

Week 13 (Nov. 28th – Dec. 2nd)

- Return to Eugene
- Reflect and write journals on the sabbatical experience
- Prepare to write the sabbatical report

2. **Growth** – How will this activity contribute to your growth as a professional person? How will the proposed sabbatical improve your work as a faculty member? If you have taken a sabbatical in the past, explain how this leave will contribute to your professional development either building on or separate from your previous leave(s). **(25 points)**

   Criteria for evaluation:
   - Extent to which activity contributes to growth as a professional person
   - How the proposed sabbatical will improve your work as a faculty member

The sabbatical will be an opportunity for tremendous growth on a personal and a professional level. Sufficient time and opportunity to connect and collaborate with the math community in Taiwan is something that can't be accomplished during the short visits with family that I make roughly every other summer. I have been living in the U.S. for the past 23 years and Taiwan has changed significantly in many areas, including the education system. I have little knowledge of the current math education system and the extent of the changes that have occurred over the years. Understandably, I have not often had the opportunity to use Mandarin Chinese in the context of math (or education in general) since my student years in Taiwan. I am excited to have the opportunity to immerse myself in math using a language other than English. I will be able to brush up on technical Mandarin that I do not get to use regularly, while gaining a great deal of knowledge on math education in various areas. The sabbatical will give me valuable connections with colleagues in Taiwan and provide the window for more collaboration and learning opportunities in the future.

The skills and knowledge that I accumulate from the sabbatical will enable me to be a better teacher in many ways. First of all, it will expand my ability to provide examples to my students that can help them understand math from a multicultural perspective. I regularly incorporate examples that I have learned as a student in Taiwan, to show students different methods to solve problems. Students have often mentioned in my evaluations that they appreciate learning the different ways of doing math. Secondly, the chance to observe many teachers closely will provide me with the best condition in which to reflect and improve my own teaching skills. Ultimately, this will translate to an improved ability to help students learn math better. I constantly strive to improve the experience for students in a math classroom and to help them be more successful, so they can achieve their dreams.

Last but not least, this research opportunity allows me to gather substantial material for a possible journal article and/or a presentation to a math conference in the near future.

3. **Relevance and Value** - How is this activity valuable and relevant to one or more of the following: division/department, discipline, program, profession, and/or students? **(15 points)**

   Criteria for evaluation:
   - Demonstrated relevance and value to division/ department, discipline, program, profession, and/or students

Apart from what I have mentioned above, I believe the experience gained from this sabbatical will be valuable to my division, and most importantly to the students. The various levels of math classes that I will be observing in Taiwan are equivalent to what we offer here at Lane in the developmental and college level math classes. I have been the lead instructor for the math 60-65 (elementary and beginning algebra) courses in the past few years, which consist of the largest sections offered in the math division. This means that I have the responsibility and pleasure to work with many of our part time faculty, especially in the areas of promoting student success through curriculum development and discussions on topics ranging from maintaining course standards, sharing of pedagogical approaches, to ways to retain math skills. I have led and participated in several FIGs to facilitate collaborations between full time faculty and part time faculty. The knowledge from the sabbatical will be tremendously helpful and useful as I continue my active role in the division to promote student success. I have not taught Math 211 -- 213 sequence (for Education majors) in the last three years, and I expect this project will reignite my passion for teaching this sequence again. I will be a more knowledgeable teacher and will be able to contribute more to all the courses I teach.

Finally, I believe the cultural experience and perspective in the context of math education will enrich the division and the college as a whole. I'm optimistic that the opportunity to work with math colleagues in Taiwan will be a door to possible future connection and collaboration for my LCC colleagues.

4. **College Core Values and Strategic Directions** - Choose one of the College core values or strategic directions and explain how this activity is relevant. Please include this response to a maximum of ½ page typed. (Please see: http://www.lanecc.edu/research/planning/strategicplan.html) **(10 points)**

   Criteria for evaluation:
   - Demonstrated relevance to core values or strategic directions

My proposed sabbatical project touches on several core values of the college. If I had to pick just one, I think *Learning* would be the central theme. I would be learning from others and translating my learning to Lane students and my colleagues. The Taiwanese colleagues who I will be working with will also learn from me to gain knowledge on math education in the U.S. In particular, the community college model we have here is unique and I believe Lane Community College deserves recognition on an international level. One of the most valuable attributes of a good teacher, in my opinion, is to model learning for the students. I will be sharing the wealth of knowledge, stories, and examples that I receive from the sabbatical with my students, to help them learn math better in a caring environment. Teaching them to view math as a language and to understand the challenges about learning math for different language learners will lessen their anxiety in their learning process. I envision ~~a~~ ripple effect of learning taking place for other math educators as well, as I continue to share this approach with other teachers and present what I learn in the division, as well as in the wider math community.

5. **Evaluation of Success and Dissemination** - In addition to a written and oral report of your activities, it is expected that you will share your experience with other faculty. This can formal or informal. What format might that take, and how can the committee assist you? **(10 points)**

Criteria for evaluation:

- Evaluation and dissemination, methods of evaluating success, and methods for disseminating and sharing sabbatical report.

My goal of comparing and contrasting math education in the two countries will be achieved through thoughtful observations, good note taking, respectful interviews, journaling and writing. I will evaluate the success of my project by the set timelines, the number of examples I will gather, and by reflecting on the experience for growth and areas for personal and professional improvement.

Besides the written and oral report of my sabbatical project upon my return to the college, I anticipate sharing of my experience with other faculty in the following formats:

- The informal sharing of my experience with math and science colleagues in hallways, offices and in the division lunchroom. Although conversation under these conditions is informal, I have learned many useful things this way from my colleagues.

- Division Colloquium -- I am the co-chair of Math Division Colloquium and I expect to share the experience and the findings with colleagues sometime in the winter term or spring term of 2017.

- Conference presentation -- I have attended several ORMATYC conferences in the past and given one well-received talk. I would like to use the material gained from my sabbatical to prepare for another talk, and to represent Lane Community College.

- Journal Submission --This is a goal that I am excited to achieve. I believe not many math faculty from Lane have submitted writings for a professional journal, and it is something that I would like to do (although this may be a more ambitious goal than I can manage while maintaining my normal teaching schedule).

Preliminary research questions:

Here are some of the preliminary questions that I am developing for this research. Changes and additions will be made as I continue my reading.

1. What are the similarities and differences between teaching math in English and in Chinese?
2. What are the similarities and differences between learning math in English and in Chinese?
3. What are some ways that the language structures affect the learning of math in the two languages?
4. How do the attitudes towards math differ among students in the two countries? What are the similarities?
5. How do teachers learn to teach math in Taiwan?
6. What are the entrance and exit requirements for becoming a math teacher in Taiwan?
7. What is the design of math curriculum at the elementary school level? Junior high school level? High school level?
8. What are the measuring tools for student success in a course?
9. What are the ramifications when students do not pass the course?
10. What math classes are offered at the college level?
11. What is the passing rate of college level math classes?
12. How do teachers collaborate and address professional development?

Tentative reading list –

Bong, M., & Skaalvik, E. M. (2003). Academic self-concept and self-efficacy: How different are they really? Educational Psychology Review, 15(1), 1–40.

Bulgar, S. (2008). Enabling more students to achieve mathematical success. In B. Sriraman (Ed.), Creativity, giftedness and talent development in mathematics (pp. 133–154). Charlotte: Information Age Publishing.

Bruria Shayshon & Hagar Gal & Bertha Tesler & Eun-Sung Ko. Teaching mathematically talented students: a cross-cultural study about their teachers' views. Published online: 3 August 2014 @ Springer Science+Business Media Dordrecht 2014

Darling-Hammond, L., Wise, A., & Klein, S. (1999). A license to teach: Raising standards for teaching. San Francisco: Jossey-Bass.

Greenberg, J. & Walsh, K. (2008). No common denominator: The preparation of elementary teachers in mathematics by America's education schools. National Council on Teacher Quality. From http://www.nctq.org/p/publications/docs/nctq_ttmath_fullreport_20080626115953.pdf

Hamamura, T., Heine, S. J., & Paulhus, D. L. (2008). Cultural differences in response styles: The role of dialectical thinking. Personality and Individual Differences, 44(4), 932–942.

Holton, D., Cheung, K-C., Kesianye, S., de Losada, M. F., Leikin, R., Makrides, G., & Yeap, B. (2009). Teacher development and mathematical challenge. In E. Barbeau & P. Taylor (Eds.), Challenging mathematics in and beyond classroom. New ICMI study series: The 16th ICMI study (Vol. 12, pp. 205–242). New York: Springer

Ingersoll, R. M. (Ed.). (2007). A comparative study of teacher preparation and qualifications in six nations (CPRE Research Report No. RR-57). University of Pennsylvania: CPRE.

Lalley, J.P. & Miller, R.H. (2006). Effects of preteaching and reteaching on math achievement and academic self-concept of students with low achievement in math. Education, 126 (4), 747-755

Lassig, C. J. (2009). Teachers' attitudes towards the gifted: The importance of professional development and school culture. Australasian Journal of Gifted Education, 18(2), 32–42

Lin, H.-L., Gorrell, J., & Taylor, J. (2002). Influence of culture and education on U.S. and Taiwan preservice teachers' efficacy beliefs. The Journal of Educational Research, 96(1), 37–46.

Matthews, L. E. (2005). Toward design of clarifying equity messages in mathematics reform. The High School Journal, 88(4), 46–58.

Mullis, I. V. S., Martin, M. O. & Foy, P. (2008). TIMSS 2007 international mathematics report: Findings from IEA's Trends in International Mathematics and Science Study at the fourth and eighth grades. Chestnut Hill, MA: TIMSS and PIRLS International Study Center, Boston College.

Rowlands, Stuart & Carson, Robert (2002). Educational Studies in Mathematics. 2002, Vol. 50 Issue 1, p79-102.

Stevenson, H.W., & Lee, S.Y. (1990). Contexts of achievement: A study of American, Chinese, and Japanese children. Monographs of the Society for Research in Child Development, 221 (55), 1-2.

Tsao, Y.L. (2004). A comparison of American and Taiwanese students: Their math perception. Journal of Instructional Psychology, 31 (3), 206-213.

Tirri, K. A., Tallent-Runnels, M. K., Adams, A. M., Yuen, M. & Lau, P. S. Y. (2002). Cross-cultural predictors of teachers' attitudes toward gifted education: Finland, Hong Kong, and USA. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.
Tomlinson, C. (1995). Deciding to differentiate instruction in middle school: One school's journey. G

Wei, Mei-Hue. (2011) Why do Taiwanese children excel at math? By: Mei-Hue Wei; Eisenhart, Corinne. Phi Delta Kappan. Sep, Vol. 93 Issue 1, p74-76.

Yoshino, Asako. (2012) The relationship between self-concept and achievement in TIMSS 2007: A comparison between American and Japanese students. . International Review of Education / Internationale Zeitschrift für Erziehungswissenschaft. Apr2012, Vol. 58 Issue 2, p199-219.

The committee can award up to 20 additional points for the overall quality of the sabbatical application.

TOTAL POINTS POSSIBLE: 110

Applicants must receive at least 55 points in Section 3 to be considered for a sabbatical award.

ADDITIONAL POINTS

Provided you have a minimum of 55 points on Part 3, up to 25 points will be added to your score on the following basis:

- 12 points if this would be your first term of sabbatical leave,
- 6 points if this would be your second term of sabbatical leave, or
- 3 points if this would be your third term of sabbatical leave
- AND one point for each year since hire as a contracted faculty member including this year if you have never taken a sabbatical OR one point for each year since your last sabbatical.

Please calculate your potential additional points below.	**Your Points**
Enter 12 points if this would be your first term of sabbatical leave, 6 for second, or 3 for third.	12
Enter one point for each year since hire as a contracted faculty member including this year if you have never taken a sabbatical *OR* one point for each year since your last sabbatical including this year.	8
Total Points	
Total with limit – If the total is 25 or less, write your total here. If it is more than 25, enter 25 here. (25 is the maximum.)	**20**

The final selection will be based on attempting not to award too many sabbaticals within the same disciplines. (Please see 23.8.7.1 of the faculty contract for details.)

The decision of the Committee is final and is subject to appeal only on grounds specified by LCCEA Executive Board.