VALENCIA COLLEGE

**Individualized Learning Plan (ILP) Submission Form: Year - 2**

**Candidate's Name:** Darren Lacoste

**Dean's or Director's Name:** Russell Takashima

## Candidate Context

### Attach Educational & Professional Background (Brief Resumé) to ILP:

*This is a brief resumé that highlights your professional background. The purpose is for your panelists to recognize your accomplishment outside your ILP work. This is not an extensive resumé. This is part of the written ILP and is not evaluated by your panel.*

*See attached

### Candidate's Workload:

*Explain your workload. Try to be as specific as possible. If you are a professor, mention the number and types of classes (preparations) that you have, as well as any lab or clinical work you do. If you are a program coordinator, mention that here. Librarians and counselors should explain the particular work they are doing and will be expected to do. Describe any other professional duties that you have as part of your work at Valencia, including your participation in TLA activities.*

**Number of Contact Hours** *(fall, spring, summer)*

*All courses listed below are taught in the "face-to-face" mode.*

Fall 2014: 15 contact hours from two sections of the 3-credit Intermediate Algebra and three sections of the 3-credit College Algebra

Spring 2015: 15 contact hours from three sections of the 3-credit Intermediate Algebra and two sections of the 3-credit College Algebra

Summer 2015: 12 contact hours from two sections of the 3-credit Intermediate Algebra and two sections of the 3-credit College Algebra

**Number of Preparations** *(different courses taught or modality)*

I anticipate two preparations:

In the first year, the tenure-track process taught me that I need to make a major shift in what I emphasize in my classroom. I need to make active learning and formative assessments a much higher priority. This will require a notable restructuring of both my Intermediate and College Algebra lesson plans. In addition, the type of student we see in Intermediate Algebra changed dramatically in Fall 2014 due to the redefinition of the "college ready" student. Reaching this "new" kind of student effectively will be a work in progress.

**Other Commitments** *(e.g., department coordinator, clubs, etc.)*

My goal is to create and facilitate four professional development workshops during the 201520 semester. They are all called "LCTS 1116: An Intermediate Algebra Conversation" and have been scheduled/set up so that attendees will receive professional development hours. Participants will discuss/present best practices in teaching specific topics from Intermediate Algebra, one or two topics per session.

## Professional Strengths:

*Describe what you consider to be your strengths as an instructor, counselor or librarian. Describe in broad terms the skills, abilities and experiences you bring to your position.*

**I have a passion for teaching.** In my observation, you either have this or you do not, and it is generally something that cannot be "imparted" to another individual. I love my job, and I consider working for Valencia College a sincere privilege.

**I teach with clarity.** My students tell me that I present math to them in such a way that they "just get it." For example, in my Fall 2014 Student Feedback on Instruction survey, one student remarked, "He knows his material and he knows how to get it across to the students in a fun and easy way."

**I am a licensed civil engineer.** I worked as a civil engineer for more than eleven years. I bring my professional engineering background to the classroom, and I use it to help students understand how classroom mathematics can be applied outside of academia.

**I embrace change.** I recognize that teaching methods must evolve to meet changing student needs, and when I recognize an area ready for improvement, I actively change my practice in an effort to inspire greater student learning. I temper this proclivity for change with reflective consideration, changing only when the time is right and the reasons are justified.

**I share willingly.** I enjoy sharing my ideas and techniques with colleagues. Whether this is done formally or informally, I am happy to share "what works" in helping students learn.

**Philosophy of Teaching, Counseling or Librarianship (1-2 pages):**

*The Professional Philosophy describes how you conduct your professional practice and why. It should overtly influence your course products, such as syllabi, policies, and daily lessons, and it should be unique to you and your field/discipline. More specifically, the philosophy provides concrete examples reflecting your role (teacher, librarian, or counselor), the role of your students, your instructional strategies, and your assessment methods. Note: The FLO's in your ILP should be reflected in the Philosophy statement.*

As a math educator for five years, and a civil engineer for eleven years, I have come to believe that mathematics – at its core – is the systematic application of mathematical definitions and properties towards solving problems that matter. And while my philosophy of teaching has evolved over time (and will no doubt continue to evolve into the future), several of my beliefs have held true throughout. In chronological order (as the students experience them), those include offering students meaningful choices, inspiring partnerships in student learning, providing scaffolded learning, fostering critical thinking and creating a tight assessment loop.

*Offer Students Meaningful Choices.* Allowing students to make meaningful choices regarding their learning experiences increases their motivation to participate and learn. I also believe that allowing students to negotiate course grading criteria increases student awareness of how their grades are determined, and how their actions and choices – not luck – determine the extent of their learning. I enact this philosophy through my use of grade contracts. These documents specify the requirements for earning a C, B, or A in the class, and include several negotiable elements. I encourage my students to tailor the requirements to best fit their life and learning style. Once we are agreed, we both sign and date the contract, just as professionals do outside of academia.

*Inspire Partnerships in Student Learning*. Both teacher and student must be intentional partners in inspiring student learning. Taking as given that I will do my part, students must understand that they must take an active role in their own learning if they wish to succeed. I expect them to read their texts before coming to class, practice math skills by completing their homework after class, prepare for exams using the methods I recommend, and take advantage of support resources if they struggle with any of these responsibilities. Each semester, I remind them of my "partners in learning" belief several times. (I even sign almost all emails to students "Your partner in learning," to further reinforce the idea.) I also frequently assess whether they are doing their part of the learning. For example, once or twice each week, I administer a "book reading quiz" to determine whether or not they have read their texts before coming to class. This has proved quite effective in ensuring students are prepared for classroom learning.

*Provide Scaffolded Learning*. Linking new concepts and skills to be learned with those previously learned (scaffolding) allows students to better encode them in long-term memory and enhances student learning. Because of this, I present concept links for all of my lessons illustrating to my students how course concepts relate to one another. This is particularly effective in math classes because virtually all math topics, regardless of the class or lesson, rely and build on topics from previous classes or lessons. Showing students how they cannot master one concept without first mastering a predecessor concept is invaluable. For example, to add or subtract unlike algebraic fractions, students must master two predecessor skills: turning unlike algebraic fractions into equivalent like algebraic fractions, and adding or subtracting like algebraic fractions.

*Foster Critical Thinking*. Critical thinking is defined[1] as "the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action." Critical thinking is one of the most valuable and sought-after abilities students can utilize to guide their actions. As such, I devote class time to having students learn to solve problems that require them to conceptualize, apply, analyze, synthesize and/or evaluate mathematical information, then assess whether this learning has taken place. As an example, when my students learn the transformations approach to graphing, I often have them work in groups of four, with each group having two pairs of students. Each pair of students is asked to transform a familiar graph (and associated equation) into a different graph (and associated equation). Then, the pairs within each group compare results and resolve discrepancies. Next, I select a handful of students to write their group's work on the board, and finally we discuss the work as a class. This has had a tremendous positive impact on the students' abilities to think critically, while also improving their abilities to communicate in pairs, groups, and to the class as a whole.

*Create a Tight Assessment Loop*. To accurately measure student learning, I must conduct learning activities aligned with course learning objectives, direct students to practice/develop needed skills, facilitate the students' understanding of relevant concepts, formatively assess mastery of these skills/concepts, remediate any deficiencies, and summatively assess student mastery of course learning objectives. This is a robust process with many moving parts, but the essential approach is to align instruction, skill/concept development, and assessment. As one example, I often present mathematical definitions during instruction, then ask students to provide mathematical constructs that meet (or violate) those definitions. To assess their understanding of mathematical definitions, I use the exact same process. As a second example, I often use the formative assessment "Fist to Five" to determine student understanding of a recently learned skill/concept. Each student holds up in front of them a number of fingers to indicate a measure of understanding, ranging from no understanding (zero fingers; a fist) to complete understanding (five fingers). In mere seconds, I can see data for the entire class, and then use that data to make "on the spot" pedagogical decisions.

[1] From a statement by Michael Scriven and Richard Paul, presented at the 8th Annual International Conference on Critical Thinking and Education Reform

## Faculty Learning Outcome & Implementation Plan #1:
## Action Research Project

**(Use the Action Research Project resources, including the Elements of an AR Project, AR Project Rubric, and AR Project Template, to help you to design your project.)**

### Needs Assessment for Faculty Learning Outcome #1 Action Research Project:

*Needs are based on what the faculty member wants to learn to improve student learning. Where do you see a need to improve teaching and learning? Is there a persistent problem or area of concern in your class/professional setting? What is the concern? Why are you concerned? Is there a teaching method you would like to explore/incorporate in your practice? Is there a topic in your discipline you would like to teach or present differently to improve student learning? Would you like to try alternative methods of assessment? Would you like to have evidence of the effectiveness of something you are currently doing?*

As a mathematics instructor, I understand the importance of practicing math skills to develop mastery and solidify conceptual understanding. Stated simply, completing math homework is a vital part of the learning process. While some college-enrolled mathematics students understand and share this point of view, many need to learn the importance of homework and its effect on student learning. Too often, math students assume that as long as they understood everything they did when they observed/practiced it in class, they have mastered the concepts and can reliably reproduce the skills needed to solve similar problems at a later time. Those same students often find out (the "hard way," during an assessment) that their conceptual understanding was not fully formed, and that their skills needed practice.

### Faculty Learning Outcome #1:

*The FLO statement should be connected to the Needs Assessment and explain what the faculty member will do in terms of improving student learning. An effective FLO meets these criteria: addresses no more than one result/trait; is action-oriented and measurable; action verb identifies the desired cognitive level of faculty thinking; meaning is clear to all disciplines.*

*The research question must clearly align with the FLO. In other words, the research question is the FLO statement in question form. You may have more than one research question.*

**FLO Statement**: Create a two-part case study assignment designed to increase students' homework completion rates in order to improve their abilities to demonstrate proficiency in the Chapter 4 and 5 course learning objectives.

**Research Question(s):** Will completing a two-part case study assignment designed to increase students' homework completion rates improve students' abilities to demonstrate proficiency in the Chapter 4 and 5 course learning objectives?

**Essential Competencies Addressed:**

*List the Essential Competencies and their indicator(s) that you plan to demonstrate in the FLO project. For FLO #1 (Action Research Project), SOTL and all of its indicators must be included and demonstrated.*

**LifeMap**

- Guide students in developing academic behaviors for college success (e.g., time management, study, test and note taking strategies, etc.) {study strategies}
- Employ digital tools to aid student contact (e.g., Atlas, MyPortfolio, Blackboard, Ask-A-Librarian, email, etc.) {Smarthinking, MyMathLab "Ask My Instructor"}

**Scholarship of Teaching and Learning**

- produce professional scholarly work (action research or traditional research related to teaching and learning, that meets the Valencia Standards of Scholarship
- build upon the work of others (consult experts, colleagues, self, students)
- be open to constructive critique (by both colleagues and students)
- make professional scholarly work public to college and broader audiences through Valencia's research repository and other means
- collect evidence of the relationship of SoTL to improved teaching and learning
- demonstrate use of current teaching and learning theory & practice

## Proposed Action Research Design Plan for FLO 1:

**Conditions:**

*Identify how you will limit or narrow the scope of your ARP. Include information about the course, unit or lesson, and timeline for implementation.*

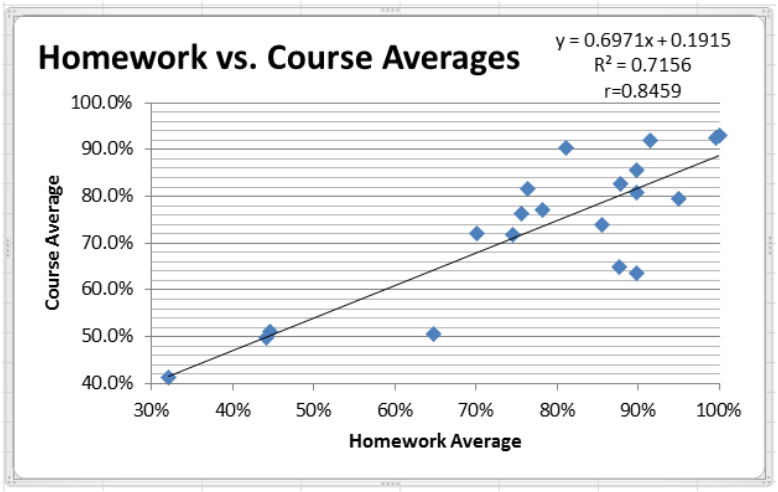
- ***Course:*** College Algebra (MAC1105)
- ***Unit or lesson:*** Unit: Section 3.2 "The Graph of a Function"
  Lesson: "Given a Function: From Input Get Output and Vice Versa"
- ***Timeline for implementation:*** Implement Year-2 Summer; Analyze/Reflect Year-3 Fall

**Adequate Preparation - Sources and Insights:**

*Describe the information you have gathered from the four lenses (Self Perspective, Student Perspective, Colleague Perspective, and Expert Perspective) that has helped you prepare for this action research project. Note: List sources consulted and provide a summary of primary insights gained from these sources.*

**The Self-Perspective**

The most compelling evidence supporting my perspective comes from homework data. During the Summer 2012 semester, I taught a Developmental Mathematics II class of 24 students. Of these, 20 students completed the course. Each student had 38 homework assignments to complete using the computer software MyMathLab. Of these 760 assignments, 138 of them (18.2%) had a score less than 50% at the end of the semester. In my opinion, this quantity (18.2%) should be much lower. When examining the relationship between homework and course averages for these same students, I found a strong positive correlation ($r \approx 0.85$). The source data are shown in the figure below.




**The Student Perspective**

During the Spring 2014 semester, I asked 25 College Algebra students this question: "Is completing math homework a vital part of the learning process? If so, why?" All 25 students answered "Yes" for a variety of reasons. One student responded, "I strongly agree that completing math homework is a vital part of the learning process because you have to actually work out the problems yourself and that triggers learning. Another responded, "Actually completing math problems is the only way to learn how to do different types of math problems and equations. For me personally it is the best way to learn and remember." Looking at all of the data, the responses generally included three reasons. Their first reason (14 comments) was homework allows me to practice, and through practice, to develop math skills. Their second reason (4 comments) was homework allows me to solidify my conceptual understanding. And their third reason (4 comments) was completing homework ensures retention of math learning. Looking at this qualitative data in aggregate, it appears that most College Algebra

students understand the importance of homework. Yet, many still fail to complete assignments. Perhaps they are missing the connection between homework and course averages, and thus, learning.

To get a "preview" of the effectiveness of my proposed research, I "ran" a small version of my action research project during the Spring 2015 semester (one semester before the "official" version). One student remarked that the assignment "shot him straight through the heart. Twice." When I asked what he meant by that, he explained that the assignment had identified his greatest weakness (a lack of motivation to complete homework), and illustrated empirical evidence which provided that motivation. I am hopeful that this is not an isolated incident, and that my proposed action plan will result in not only increased homework completion rates, but increased learning as well.

**The Colleague Perspective**

I have also explored this issue through conversations with Joel Berman and other colleagues through the years. Generally speaking, these faculty members agree that getting the students to complete their homework in a way that results in learning can be challenging. When I shared my intended intervention with them, all of them felt my investigation was worth doing, and most expressed an interest in "hearing how things turn out." One of the conversations was particularly memorable. It included a short story from Joshua Guillemette, who had asked his students (one on one) how they would prepare for a dance recital. Nearly all students responded that they would practice their routine until it was ready. When I share this story with my students, I remind them that "getting good at math" is a lot like preparing for a dance recital. You can't merely watch an expert do it; you have to practice. Which reminds me of one of my favorite quotes:

> "Perfect practice makes perfect." – Derric Johnson

**The Expert/Research Perspective**

As shown above, there is a strong positive correlation between algebra student homework averages and course averages. Thus, it is reasonable to conclude that encouraging students to complete their homework, and equipping them with effective strategies for information acquisition in so doing, should result in improved learning (Tuckman, 1996). Of these two components, the more challenging for me as an educator is the motivation aspect. Thus, much of my research centered on this issue. A common theme that emerged was providing students *incentives*, defined as the goal objects that students desire (Tuckman, 1996). By extension, *incentive motivation* gives students the desire to attain those incentives, which in an education setting, are course grades (Petri, 1991). The takeaway here is simple: teach students that completing their homework assignments the "right" way correlates to attainment of their desired course grades. As an interesting side note, Zimmerman, Bandura, and Martinez-Pons (1992) found that students were motivated by both the grades they set out to achieve and the lowest grade they deemed satisfying.

Anliker, R., Aydt, M., Kellams, M., & Rothlisberger, J. (1997). *Improving student achievement through encouragement of homework completion.* Retrieved from ERIC database. (ED415022)

Cooper, H. (2002). Recommended homework policies. *CQ Researcher 12*(42), 1004-1007.

Guillemette, J. (Fall 2011). Developing students' mathematical skills. As discussed during the faculty mentor/mentee program. Valencia College, East Campus, Orlando, FL.

Hanson, O. (2013). *Homework that works: Professional development for teachers.* Retrieved from http://scholarworks.calstate.edu:9000/bitstream/handle/10211.2/3218/RevisedHansonGraduate Project.pdf?sequence=1

Petri, H. L. (1991). *Motivation: Theory, research and applications* (3rd ed.). Belmont, CA: Wadsworth.

Sommers, J. (2011). Self-designed points: Turning responsibility for learning over to the students. *Teaching English in the Two-Year College, 38*(4), 403-413.

Tuckman, B. W. (1996). The relative effectiveness of incentive motivation and prescribed learning strategy in improving college students' course performance. *The Journal of Experimental Education, 64*(3), 197-210.

Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal, 29*, 663-676.

## Methods and Assessment Plan for FLO 1:

### Student Learning Outcome Statement (SLO):

*A Student Learning Outcome states what a student should understand and/or be able to do as a result of what she has learned in a course, library orientation, counseling session. Note: The SLO should align with the FLO and RQ.*

**SLO Statement 1:** Students will complete their homework.

**SLO Statement 2:** Students will demonstrate proficiency in the Chapter 4 and 5 course learning objectives.

### Teaching, Counseling, or Librarianship Strategies of Student Learning Outcomes:

*Describe the methods, strategies, and/or techniques you will use to support student mastery of the student learning outcome(s) you identified in your project. These strategies should be listed in order and should be specific enough for feedback.*

I want to improve my students' understanding of the importance of homework as a tool for mathematical learning. I plan to do this by creating a two-part case study assignment.

The first part is a self-assessment accompanied by a reading assignment; it is intended to provide students with a measure of how effective their current homework strategies are, and direction on how to improve them. The self-assessment will be a number of multiple choice questions. Each will list various strategies with associated point values. The total score will indicate the effectiveness of the strategies employed. The reading assignment will have five components: (1) Where students should complete their homework, (2) Goals for accuracy and completeness, (3) When students should start/finish their homework, (4) How students should format their homework, and (5) How students should use (not abuse) help resources.

The second part is intended to encourage students to complete homework assignments effectively and therefore succeed in the course. It is a series of math problems that collectively demonstrate the correlation between course homework averages and overall course averages. The assignment will present data from my Fall 2014 College Algebra class and a "best fit" line relating these two quantities. Students will then perform various tasks, including: (1) Given a homework average, predict the associated course average, (2) Given a course average, predict the associated homework average, (3) State the lowest course grade they would find satisfying and predict the homework average they must earn to attain it, (4) State the course grade they wish to achieve in the course and predict the homework average they must earn to attain it, and (5) Determine their current homework average and predict their final course average. Finally, students will be asked if they feel they need to improve the effectiveness of their homework habits to reach their goals.

For my Action Research Project, I wish to use two College Algebra classes — scheduled back-to-back on the same days — one of which uses the treatment described above and the other of which uses an unrelated task requiring similar student effort. I wish to determine the effect of the treatment on student understanding of the importance of (1) completing homework, and (2) completing homework effectively, as tools for mathematical learning.

Both classes of students will complete their homework for Chapters 1 and 2 of the course as normal. During Chapter 3, the experimental group will receive the two-part case study assignments described above. The self-assessment/reading assignment will be given at the beginning of the chapter. The math problems assignment will be given as part of Section 3.2, which includes the content needed to complete the problems. In contrast, the control group will complete two different assignments, a reading assignment on the importance of placement exams and a series of real-world math problems that illustrate a (fictional) correlation between placement exam scores and College Algebra course averages. The control group's assignments will use the same timeline as the experimental group's assignments. Both groups will have a question on their Chapter 3 Test that is similar to their respective "math problems" assignments.

## Assessment Strategies of Student Learning Outcomes

*Describe the tool(s) you will use to measure/gauge how students perform in relation to the Student Learning Outcome. Describe both formative (along the way) and summative (at the end) tools that you will use to assess student learning, as well as tools you will use to inform students of the criteria by which they will be evaluated.*

The software that students use to complete their homework is called MyMathLab; it scores their homework and stores it in an electronic gradebook. After both groups complete Chapters 1 and 2, I will compute the homework average from those chapters for each student. I will also determine the percent of those assignments completed with a score of 50% or higher for each student. This will establish a pre-treatment performance benchmark. Then, during Chapter 3, the experimental group will receive their treatment while the control group will receive their comparable but unrelated assignments. Next, both classes will learn about the free online tutoring software Smarthinking. Both groups will take their Chapter 3 Test. The experimental group will have a question involving the correlation between homework averages and course averages. The control group will have a question involving the (fictional) correlation between placement exam scores and course averages. The problems will have identical numbers and structure, but different "theming." At the beginning of Chapter 4, the experimental group will receive a formative assessment in which they compute their homework average and compare it to the two target homework averages from the math problems assignment. This will inform their progress in meeting their goals. Finally, after both groups complete Chapters 4 and 5, I will compute the homework average from those chapters for each student. I will also determine the percent of those assignments completed with a score of 50% or higher for each student. I will measure and compare the change in homework averages and change in homework assignments completed for both groups (using a student-to-same-student comparison). In addition, I will compare the Chapter 4/5 Test scores for the control and experimental groups.

## Action Research Design

*Describe the types of data you intend to collect and the methods you will use to analyze that data (e.g. pre- and post-surveys, pre- and post-skill or knowledge assessments, experimental group/control group, etc.). Consider whether the type and amount of data collected is reasonable and manageable and aligns with your FLO/SLO/RQ, that is, measures what you intended. Describe the evidence you will use to judge the value of your intervention.*

A typical College Algebra class has 30 students. So, following my research, I will have approximately 60 values from the experimental group (two from each student), and approximately 60 values from the control group (two from each student). These values will represent the change in homework averages and the change in homework assignments completed (using a student-to-same-student comparison). I intend to compare the average and median of the experimental group's values to those of the control group. In addition, I intend to compare the average and median of the experimental group's Chapter 4/5 Test scores to those of the control group.

The action timeline for this work is…

1. After the last homework assignment from Ch. 2 closes, (1) calculate the homework average from each student, and (2) determine the percent of homework assignments completed with a score of 50% or higher.
2. At the beginning of Ch. 3, assign the experimental group Part 1 of their Case Study.
3. At the end of Section 3.2, assign the experimental group Part 2 of their Case Study.
4. At the end of Section 3.2, assign the control group their Case Study.
5. When convenient during Ch. 3, teach both classes about the free online tutoring software Smarthinking.
6. Administer both versions of the Ch. 3 Test.
7. At the beginning of Ch. 4, administer the formative assessment to the experimental group.

After the last homework assignment from Ch. 5 closes, (1) calculate the homework average from each student, and (2) determine the percent of homework assignments completed with a score of 50% or higher.

## Faculty Learning Outcome & Implementation Plan #2:

**Needs Assessment for Faculty Learning Outcome #2:**

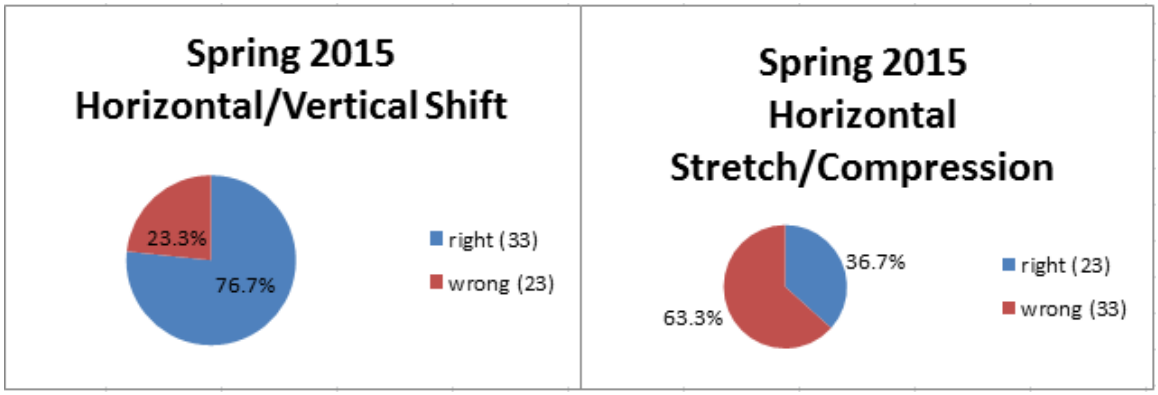
*Needs are based on what the faculty member wants to learn to improve student learning. Where do you see a need to improve teaching and learning? Explain in general terms what you would like to investigate during your pre-tenure period that would improve your practice and student learning. This might include, but is not limited to, improving such things as*

I have taught College Algebra at Valencia College for three semesters now. In that time, I have noticed that College Algebra students tend to struggle with the topic Graphing Techniques: Transformations. As part of their work for this section, they are asked to transform a given graph or equation into another graph or equation in several different ways. They could be asked to shift the graph left or right. They could be asked to shift the graph up or down. They could be asked to stretch or compress the graph vertically. They could be asked to stretch or compress the graph horizontally. They could be asked to reflect (rotate) the graph around the x-axis or the y-axis.

Most of the time, the students struggle with the horizontal shifts more than with the vertical shifts. For example, given the equation/function/graph y=f(x), the graph of the shifted y=f(x+4) looks like the original graph, except it has been moved 4 units to the left. Because of the "+" sign, many students assume (incorrectly) that the original graph is shifted to the right 4 units. They fail to understand that x+4 should be thought of as x–(-4), wherein the number being *subtracted* (in this case, -4), is the one that indicates the direction of shift.

Mastering this topic requires an in-depth understanding of graphing, functions, and function notation. My students need better instruction from me to help them navigate this challenging skill set.

The most compelling evidence supporting the need stated above comes from test data. During the Spring 2015 semester, I taught two College Algebra classes totaling 62 students. On their exam which assessed their knowledge of Graphing Techniques: Transformations (60 students took the exam), 46 students (76.7%) correctly answered the question involving horizontal and vertical shifting, but only 22 students (36.7%) correctly answered the question involving horizontal compression. These data indicate a need for improved learning, particularly in using the horizontal stretch/compression transformation. They are summarized in the diagrams below.




I have also had conversations with colleagues regarding this issue. In fact, as part of our initial tenure-track work, one member of my cohort identified this topic as a challenging one for her and her students as well. There is consensus that the transformation of "arbitrary" functions, combined with the potential challenge of graphing, represents an abstraction for students that is difficult for them to understand.

**Faculty Learning Outcome #2:**

*The FLO statement should be connected to the Needs Assessment and explain what the faculty member will do to improve student learning, as applicable. An effective FLO meets these criteria: clearly relates to the Needs Assessment; is specific, action-oriented, cognitively appropriate, and measurable/assessable; and meaning is clear to all disciplines.*

**FLO Statement**: Create cooperative learning opportunities to improve students' abilities to transform[2] an equation or graph using horizontal stretching/compressing techniques.

[2] "Transform" is a technical term in mathematics that encompasses the techniques employed: shifting, stretching, compressing, and reflecting.

**Essential Competencies Addressed:**

*List the Essential Competencies and their indicator(s) that you plan to demonstrate in the FLO.*

**Assessment**

- Employ formative feedback loops that assess student learning and inform students of their learning progress
- Give timely feedback on learning activities and assessments

**Learning-Centered Teaching Strategies**

- Use cooperative/collaborative learning strategies (e.g., peer to peer review, team projects, think/pair/share, etc.)
- Invite student input on their educational experience (e.g., choice among assignment topics, classroom assessment techniques, etc.)

**Outcomes-Based Practice**

- Create a new, or revised, learning outcome for a unit, course or program that meets the criteria for learning outcomes (this performance indicator must be used in conjunction with at least one other Outcomes-based Practice indicator for demonstration in faculty portfolios)
- Align unit, course, and/or program outcomes with one or more student core competencies (Think, Value, Communicate & Act)

**Conditions:**

*Identify how you will limit or narrow the scope of your FLO 2. Include information about the course, unit or lesson, and timeline for implementation.*

I will limit/narrow the scope of this FLO by using just one course (MAC1105) and topic (Graphing Techniques: Transformations), and within them, one student learning outcome: transformation of a graph/equation using horizontal stretching/compression techniques. I will prepare for, implement, and debrief this effort during the Year-3 Fall semester.

**Products/Evidence of Learning:**

*What evidence of learning will you produce to demonstrate achievement in your FLO?*

*Examples: learning unit(s), rubric(s), lesson/unit plan(s), formative and summative assessment instruments, student-constructed work, surveys, classroom assessment techniques, course design(s), conference presentation(s), Valencia presentation(s), scholarly publication(s), professional certification(s), etc.*

Students will complete a group project. In Part 1 of this project, the students will work together to create a table describing the different types of transformations, and how each type affects (1) the graph,

(2) the equation, and (3) the coordinates. They will also explore horizontal stretch/compression transformations by completing several problems of that type. In Part 2 of this project, each student will select one type of transformation (shift left, shift right, shift up, or shift down) and will explore it thoroughly by completing several problems of that type. The last of these problems will combine a horizontal stretch/compression and the selected transformation in a single problem. Although the final group product will consist of Parts 1 and 2, approximately 80% of the project grade will come from Part 2. It is my intention to structure the student work tasks to meet the Kagan cooperative learning standard of Positive interdepencence, Individual accountability, Equal participation, and Simultaneous interaction (abbreviated PIES).

I will analyze student formative and summative assessment data for this topic; each assessment will be completed by an individual student working alone. The formative assessment will be two problems (one horizontal compression, one horizontal stretch) which the students will complete and then self-assess using an answer key I will provide after their work is complete. The summative assessment will be one chapter test problem involving a horizontal compression. This matches the style of problem examined in my Needs Assessment. Once the chapter tests are graded, I will measure and document how many students answered the "horizontal compression" problem correctly, and compare this data to that obtained in Spring 2015.

## Faculty Learning Outcome & Implementation Plan #3:

**Needs Assessment for Faculty Learning Outcome #3:**

*Needs are based on what the faculty member wants to learn to improve student learning. Where do you see a need to improve teaching and learning? Explain in general terms what you would like to investigate during your pre-tenure period that would improve your practice and student learning. This might include, but is not limited to, improving such things as specific teaching strategies, assessment tools, implementation of web-based or technology-related tools for students, discipline-specific knowledge, and/or obtaining degrees or certifications.*

If you've taught math for any length of time, then a student has asked you, "When am I ever going to need to know this?" (or its equivalent). An essential part of the learning process for the math student involves a motivation to learn, and while grades from homework and exams provide much of this motivation, I believe life-long learning is best achieved when students are motivated with math lessons connected to practical, real-world skills and concepts. In short, my students need math instruction that is, to the greatest extent possible, immediately practical to their every-day lives, or at the very least practical to their lives in the post-graduation working world. I believe I can and should increase the percentage of problems taught in class that fit this standard.

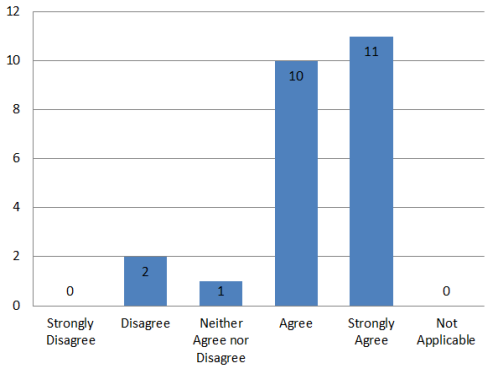
Several semesters ago, I had an insightful interaction with an Intermediate Algebra student. To protect his identity, I will call him Manny. By the fourth week of the semester, I had identified Manny as a

difficult student to reach in class. When I would call on him (as I call on every student from time to time), he would often seem disconnected from the day's lesson and unsure of what I was asking him about.

Later in the same semester, I began teaching the students linear modeling. Specifically, we were working on a problem of straight-line depreciation. To motivate the lesson, I asked the class, "How many of you own a business or plan to own a business some day?" A few students raised their hands, and one of them was Manny. I asked each student the type of business they want to own; Manny wanted to run a law firm. I asked Manny, "Will your office have any equipment in it?" He replied "Yes, like photocopy machines." I asked the class why the government would be interested in the value of Manny's business every April 15th. Several students responded, "So they can tax him!" I asked Manny what parts of his business contribute to its total taxable value. Eventually, we got to that photocopy machine. I explained that it is important to be able to determine the value of a material good as time goes by, and that one way to do that is to use straight-line depreciation.

As we solved the related problem, Manny was fully engaged. He immediately saw the value of the problem we were solving, and I could "see" the determination in his face to learn this skill which he anticipated he would need in the future. It was almost like Manny became a different student that day. The 'motivation to learn' Manny experienced when presented with a real-world problem he perceived as practical made a key difference in his learning engagement. I believe this is not an isolated incident, but rather an essential indicator of the deep learning process.

To validate this belief, I asked one of my College Algebra classes to respond to this statement: "I am more motivated to learn math concepts/skills that I can use after graduation than I am to learn math concepts/skills that I will not use after graduation." The results appear in the figure below.



**Faculty Learning Outcome #3:**

*The FLO statement should be connected to the Needs Assessment and explain what the faculty member will do to improve student learning, as applicable. An effective FLO meets these criteria: clearly relates to the Needs Assessment; is specific, action-oriented, cognitively appropriate, and measurable/assessable; and meaning is clear to all disciplines.*

**FLO Statement:** Create learning opportunities involving contextualized problem-solving to improve students' abilities to solve "real world" math problems that are relevant to their lives outside of academia.

**Essential Competencies Addressed:**

*List the Essential Competencies and their indicator(s) that you plan to demonstrate in the FLO.*

**Inclusion and Diversity**

- Design and support learning experiences that address students' unique strengths and/or needs
- Use diverse perspectives to engage and deepen critical thinking

**Professional Commitment**

- Stay current in discipline/academic field (e.g., professional organizations, conferences, journals, reading in the discipline, field work, or clinical experience, etc.) {"An Intermediate Algebra Conversation" workshop takeaways}
- Engage in expanding and building institutional, programmatic and personal connections to the wider community (e.g., community involvement, service learning, civic engagement, board of [museums, hospital, etc.], partner K12 schools, student development leadership or activities, etc.)

**Conditions:**

*Identify how you will limit or narrow the scope of your FLO 3. Include information about the course, unit or lesson, and timeline for implementation.*

I will limit/narrow the scope of this FLO by using just one course (MAT1033C). I will further limit the scope by using just four contextualized problems, the last of which will be created by the student. Specifically, it will be based on an actual experience (preferably related to their major of study) in which

they must use their Intermediate Algebra skills to find a resolution to a dilemma or problem. I will prepare for this work during the Year-2 Spring semester (during Spring Break). I will implement this work in the Year-2 Summer semester.

**Products/Evidence of Learning:**

*What evidence of learning will you produce to demonstrate achievement in your FLO?*

*Examples: learning unit(s), rubric(s), lesson/unit plan(s), formative and summative assessment instruments, student-constructed work, surveys, classroom assessment techniques, course design(s), conference presentation(s), Valencia presentation(s), scholarly publication(s), professional certification(s), etc*

I will revise my Section 2.2 digital lesson plans to include three newly contextualized problems that are intended to be relevant to students' lives outside of academia. I will also create an assignment wherein students will (1) identify an actual experience (preferably related to their major of study) in which they must use their Intermediate Algebra skills to find a resolution to a dilemma or problem, (2) present this dilemma/problem to me for approval/revision, (3) "write up" the dilemma/problem using English sentences that form a paragraph, (4) translate the dilemma/problem into the language of mathematics, (5) solve the translated problem using Intermediate Algebra concepts/skills, and (6) interpret their answers in the context of the original dilemma/problem. All four problems' solutions will be structured in the same way so that students become familiar with the steps for solving a "word problem."

I will analyze student pre-treatment, formative and summative assessment data for this topic; each assessment will be completed by an individual student working alone.

The pre-treatment problem will present the student with two coupons: one for $5 off the purchase of a single item costing $15 or more (before tax), and the other for 20% off the purchase of a single item. The student will have to answer three questions: (1) To save the most money, which coupon should be used to purchase a single item costing $17.99 before tax? (2) To save the most money, which coupon should be used to purchase a single item costing $27.99 before tax? (3) For what price do the two coupons save you the same amount of money?

The formative assessment will be very similar to the pre-treatment problem, consisting of the same problem structure with different numbers. The students will complete this problem and then self-assess using an answer key I will provide after their work is complete. It will contain a complete solution and "checkpoints," illustrating essential steps in the solution process. Students will measure whether their work illustrated these checkpoints, and compare their work/solutions to the correct work/solutions.

The summative assessment will also be very similar to the pre-treatment problem, consisting of the same problem structure with different numbers. This assessment will be repeated at the end of the semester. My goal is for 70% or more of the students to be able to successfully answer the question correctly using the steps for solving a "word problem."

The action timeline for this work is…

1. At the beginning of the semester, give students the "real-world dilemma/problem" assignment.
2. At the beginning of Section 2.2, administer the pre-treatment problem.
3. At the end of Section 2.3, administer the formative assessment problem.
4. The next class period, direct students to self-assess their work.
5. On the Chapter 2 Test, administer the summative assessment problem.
6. At the two-thirds point of the semester, collect the students' "real-world situation/dilemma" assignment.
7. The next week, return those assignments graded.

On the final exam, administer another version of the summative assessment problem.

## Professional Development

**Attach Professional Development Transcripts (seminars, courses completed, etc.)**

*Identifying your intended and completed development allows panel members to quickly review the completed work and to perhaps suggest other offerings that may assist you in your pre-tenure work.*

**Core Seminar Series (in sequence)**
**Identify which TLA recommended seminars you participated in or plan to participate in.**

This section includes courses that provide an overview on the Essential Competencies and courses that will assist you in developing an ILP, constructing a portfolio, and implementing an action research project.

| **Professional Development Activity** | **Taken**<br>*Place an **X** by the activities you have already completed* | **Date**<br>*Record the date on which you completed each activity* | **Intended**<br>*Place an **X** by the activities you intend to participate in during your pre-tenure work* | **FLO**<br>*To which FLO, if any, does each professional development activity relate? (Place an **X** by all that apply)* |
|---|---|---|---|---|
| LCTS2224: Interactive Lecture (New Faculty Orientation) | **X** | **8/7/2013** | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| PRFC2120: Launching into the TLA | **X** | **8/12/2013** | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |

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|---|---|---|---|---|
| LCTS2111: Cooperative Learning in the College Classroom | **X** | **9/27/2013** | --- | __FLO 1<br>_ **X** _FLO 2<br>__FLO 3 |
| INDV215: Inclusion and Diversity | **X** | **11/7/2013** | --- | __FLO 1<br>__FLO 2<br>_ **X** _FLO 3 |
| ASSMT212:1 Assessment as a Tool for Learning | **X** | **10/24/2013** | --- | __FLO 1<br>_ **X** _FLO 2<br>_ **X** _FLO 3 |
| PRFC2267: AMP Peer Review / Analysis of My Practice – Peer Review | **X** | **3/21/2014** | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| LFMP2141: LifeMap | **X** | **1/30/2014** | **---** | _ **X** _FLO 1<br>__FLO 2<br>__FLO 3 |
| PRFC 2161: From AMP to ILP - Creating an Individualized Learning Plan/Outcomes-based Practice | **X** | **6/13/2014** | --- | _ **X** _FLO 1<br>_ **X** _FLO 2<br>_ **X** _FLO 3 |
| SOTL2171: Scholarship of Teaching & Learning | **X** | **9/6/2014** | **---** | _ **X** _FLO 1<br>__FLO 2<br>__FLO 3 |
| SOTL2274: ARP Design and Data Collection | **X** | **4/3/2015** | | __FLO 1<br>__FLO 2<br>__FLO 3 |
| PRFC2264: Understanding Professional Commitment | **X** | **4/3/2014** | **---** | __FLO 1<br>__FLO 2<br>_ **X** _FLO 3 |
| SOTL3271: Principles of Good Practice | ---- | --/--/---- | **X** | _ **X** _FLO 1<br>__FLO 2<br>__FLO 3 |
| SOTL2272: Developing Effective Surveys | **X** | --/--/---- | **---** | __FLO 1<br>__FLO 2<br>__FLO 3 |
| PRFC 2263: Creating an Evidence-based Portfolio | ---- | --/--/---- | **X** | _ **X** _FLO 1<br>_ **X** _FLO 2<br>_ **X** _FLO 3 |
| SOTL2275: ARP Data Analysis and Presentation | ---- | --/--/---- | **X** | _ **X** _FLO 1<br>__FLO 2<br>__FLO 3 |
| **Elective Workshops to Inform Your FLO Projects**<br>**Identify which activities you participated in or intend to participate in.**<br><br>This section includes additional courses designed to deepen one's understanding of the Essential Competencies. If you intend to complete additional "other" courses, please expand this worksheet. | | | | |
| **Professional** | **Taken** | **Date** | **Intended** | **FLO** |

| **Development Activity** | *Indicate which activities you have already completed.* | *Record the date on which you completed each activity.* | *Indicate activities you intend to participate in during your pre-tenure work.* | *To which FLO, if any, does each PD activity relate? (Check all that apply.)* |
|---|---|---|---|---|
| **Assessment** | | | | |
| ASMT_____ | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| **Inclusion and Diversity** | | | | |
| INDV7310: Working with Conflict | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| INDV7311: Creating a Safe Space for Dialog | **---** | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| INDV7312: Mindfulness Tools for Educators | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| INDV7313 and 7314: SEED I and SEED II | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| INDV 2254: Art and Science of Learning and the Brain | ---- | --/--/---- | **X** | __FLO 1<br>__FLO 2<br>_ **X** _FLO 3 |
| INDV7316: How We Treat Each Other | ---- | --/--/---- | **---** | __FLO 1<br>__FLO 2<br>__FLO 3 |
| INDV2225: Multiple Perspectives | ---- | --/--/---- | **---** | __FLO 1<br>__FLO 2<br>__FLO 3 |
| OTHER: INDV _____ | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| **Learning-centered Teaching Practice** | | | | |
| LCTS2222: Case-based Teaching | **X** | **10/25/2013** | --- | _ **X** _FLO 1<br>__FLO 2<br>__FLO 3 |
| LCTS2223: Asking the Right Questions | **X** | **11/15/2013** | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| LCTS2225: Flipped Classroom | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| LCTS2226: Write to Learn | **---** | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| LCTS2214: Problem-based | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2 |

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| Learning | | | | __FLO 3 |
| LCTS3160: 101 Ways to Demonstrate the Essential Competencies | ---- | --/--/---- | **X** | _ **X** _FLO 1<br>_ **X** _FLO 2<br>_ **X** _FLO 3 |
| LCTS 2218: Speaking Across the Disciplines | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| LCTS2227: Cultivating a Growth Mindset | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| OTHER:<br>LCTS_____ | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |

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| **LifeMap** | | | | |
| LFMP 3348: CARE Strategies | ---- | --/--/---- | **X** | _ **X** _FLO 1<br>__FLO 2<br>__FLO 3 |
| OTHER:<br>LFMP_____ | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| **Outcomes-based Practice** | | | | |
| LOBP 2230: Core Competencies: Think, Value, Communicate, Act (TVCA) | ---- | --/--/---- | **X** | __FLO 1<br>_ **X** _FLO 2<br>_ **X** _FLO 3 |
| LOBP 3230: Thinking Things Through: Critical Thinking Theory and Practice | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| OTHER:<br>LOBP_____ | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| **Professional Commitment** | | | | |
| PRFC 3365: Learning Partners | ---- | --/--/---- | **X** | __FLO 1<br>_ **X** _FLO 2<br>_ **X** _FLO 3 |
| OTHER:<br>PRFC_____ | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| **Scholarship of Teaching and Learning** | | | | |
| SOTL 2273: IR and You: How IR Can Help Faculty Research | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |
| OTHER:<br>SOTL_____ | ---- | --/--/---- | --- | __FLO 1<br>__FLO 2<br>__FLO 3 |

| **Describe any other professional development activities, such as graduate courses completed, conferences attended, books read, and/or journal articles read in the space provided below.** |
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