

# Program Review



## ADP/Program Review - Mathematics

### 2020 - 2021

**1. Department Goals - Current Progress:** First of all, you should know that this Program Review has been written primarily by one person (Kevin) and there are rather frequent editorial comments that may not be shared by the department as a whole. These faculty have sacrificed and continue to sacrifice time and money to try to support their students as best they can considering the crazy circumstances. The details should be accurate within the individual sections but this is far from complete. Let us begin :)

If you have any knowledge of the last few years, you will know that we have been experiencing a series of impossibly difficult challenges. Some apply to all walks of life and some are education specific but we are "inundated in change." Pretty much any list of goals from even three years ago is almost completely out of date, or hopelessly buried and counted as insignificant relative to what is happening now. Here is a brief summary of a few of the more significant items.

1. Fall 2019 marked the implementation of AB-705. Old course placement methods are gone and replaced by specific state placement benchmarks based primarily on high school grade point averages into first level transfer courses.
  - 1a. We were and are compliant with the law. All students have access to STAT 300 and Math 300, some with support.
  - 1b. All students pursuing Business or STEM place into transfer level if they had Algebra 2 in high school or into Math 120 if they hadn't.
    - 1b. i. Based on 3 semesters, we do not have sufficient sections of Math 120 (or below) to serve the students that wish to pursue the BSTEM path but did not previously have sufficient preparatory mathematics.
  - 1c. No guidance or tool was made for placement beyond Trigonometry on the STEM side of our offerings. Some of this was resolved through coordinated efforts among the district math departments.
  - 1d. Much of the placement model is now done manually whereas before it was mostly automated. Hundreds of transcripts (high school and college level) must now be looked at because placement tests are no longer allowed.
  - 1e. Chemistry 305 and 400 placements now almost all be checked by hand!
  - 1f. Enrollment into corequisite pairs has been a significant issue that is beyond the technological capability of PeopleSoft. We are about to implement (Spring 21, along with English) a "third method" of enrollment for students that will hopefully allow us to have waitlists but will, unfortunately, involve yet another manual process!
  - 1g. It needs to be mentioned that while this new placement method has been implemented, we are far from finished with it as a project and our financial support from the district has been cut off. The cut off took place before the current budget crisis and the general feeling of the faculty is that if it truly is a district priority, it should be supported.
  - 1h. It should be noted that the department was not satisfied with the previous placement model as it was. Expectations were and are that AB-705 will improve throughput of transfer level Math/Stat and these are being borne out. If we were to compare the 15-16 school year to 19-20, the number of students that passed STAT 300 nearly doubled (from 509 to 1011)!!!! This basically represents students on a SLAM pathway taking their first transfer level course. This isn't surprising but it is still impressive :) This date comes from our Student Success and Equity Dashboard.

### 2. Math Center

- 2a. Marc Olsen (from Math) and Sam Raskin, thanks to some help from Science faculty involved with the Science Center have piloted a Math Center for our students.
- 2b. With all students now able to begin at transfer level mathematics, it is obvious that while their subject skills may be appropriate, there is a lot more to being a student in college.
- 2c. The experimental offering (Math 299) course has been used in Spring 20 and Fall 20 for this purpose. This 0.5 lab unit allows students to work on several aspects of "being a college Math/Stat" student with an experienced mentor or instructor.
- 2d. We are currently creating LTAT 30 and 31 (Learning, Tutoring, and Academic Technology) courses for students to use on a permanent basis. The second course allows students an opportunity to further strengthen existing skills as well as delve into new ones if taking additional transfer level courses.
- 2e. The Math Center cannot and will not run by itself. It requires a limited amount of FTE for a few full time faculty to be involved and it also requires Instructional staffing and the hiring of student mentors. We have recently received word of the

Title III grant award which will help fund the Math Center for a few years. Currently, the Instructional Staff need is being shared with the Science Center that we are patterned after.

### 3. Math 300 (+ support)

- 3a. We finally have Math 300, Introduction to Mathematical Ideas in our schedule of classes!
- 3b. This course fits in our Liberal Arts majors pattern and is an acceptable alternative to STAT 300 for some majors.
- 3c. The placement model for Math 300 is the same as for STAT 300. Some students will take Math 300 + MATHS 95 which is the option that provides additional corequisite support (AB-705).

### 4. Well, it cannot be ignored any longer. Most of the above items and nearly everything that could and should fall on this list have been eclipsed by the COVID-19 world-wide pandemic!

- 4a. We are fully online in an emergency situation that is currently slated to continue through at least the Spring 2021 semester.
- 4b. Nearly all of our available energy is being consumed by just trying to get a reasonable facsimile of what we do into a 100% online modality!
- 4c. Technology and textbook issues dominate the landscape! This includes faculty and students (and everyone else involved with the college).
- 4d. Whereas courses that involve submitted writing can use "plagiarism checks," there is no such tool available in Math (There are a few other disciplines similarly challenged.)
  - 4c. You cannot, efficiently use technology to write math at a rate anywhere close to what can be handwritten. The result is that faculty are having to make many changes without benefit of previous experience to go by.
  - 4d. Many more sections are requiring students to purchase access codes to assist with homework and quizzing. This is far more costly to our students than what we previously could use in class.
  - 4e. Grading of handwritten, scanned items is far more difficult through Canvas (or any other tool) than simply having a stack of papers.
  - 4f. Academic integrity issues are springing up with, perhaps, all classes!
- 4g. We are, however, making significant strides related to online instruction. Everyone has sacrificed a lot of time (and money) to be able to serve our students!

### 5. Impact of current fiscal situation.

- 5a. Extreme cuts have taken place throughout the state (actually, the world).
- 5b. Currently, resources are not available to pursue getting help with manual placements into other disciplines such as Chemistry, Physics, Engineering, and Psychology.
- 5c. A substantial amount of FTE was cut from the schedule and if you combine the fact that we have fewer sections to offer with the fact that there may be an influx of students choosing Community College over 4-year school prices, ours sections are full.
- 5d. Another, significant impact, is that we cannot offer some of our valued adjunct classes to teach. This is a problem that is also "pandemic."
- 5e. The reality with the online modality is that 2 classes of 40 now comprises a realistic full time load. With the amount of time needed to "write" math and the length of time it takes to grade papers (2 to 3 minutes to even open a file to grade sometimes), the incredible uptick in email, etc. the old model of 15 units being full time is not even close to reality!

### 6. Drilling down into the data!

- 6a. We truly do want to better serve our students! If new laws and/or district projects do not stop, there simply won't be enough time to work towards building equity.
- 6b. If we don't have time to really look into the areas of greatest needs, we cannot even begin to try and work towards solutions!
- 6c. What are the most impacted populations? What Learning Outcomes need more work/new methods? What other ways could we serve our students?
- 6d. Again, we are so busy that most department members simply will never have the chance to look beyond to bigger possibilities because the day to day required tasks consume too much of our time!
- 6e. We might also gain strength and support from the Equity Center but, again, there has been no time to form a relationship here yet.
- 6f. Additionally, while there has been ample opportunity for Equity related training, finding resources that can also be applied in Math/Statistics has been extremely difficult to non-existent after multiple queries and also personal searches on the internet. This is by no means a statement about "giving up" but merely to demonstrate that this will be a long term process that we cannot hope to succeed with if there is no release time for faculty or financial support to implement ideas or strategies that come up.
- 6f. A brief look at the data dashboard shows some promising data for Statistics for some of the traditionally most impacted

populations (Spring 2020). The relatively small sample size and the greater need for serving our students beyond "pass rates" immediately reminds us that there is more work to do but a glimmer of hope is nice :)

**2. Department Goals - Future:** Honestly, if you were to survey the department now, "survival" is of highest priority followed very closely by "what is within our ability to help our students in this emergency online education reality?"

1. We do actually have an interest in training! During the semester we teach and have little to no time for much training and we certainly don't have time to implement something big and new into a course that was well planned out before the semester began.

1a. How do we effectively utilize corequisite support class time to help students, some of them severely underprepared, succeed in the transfer level class? We were given a concept that was approved by our Chancellor's Office with no time, well tested examples to refer to, or support to make it happen.

1b. Online instruction. There have been numerous opportunities to learn some best practices of online education when it comes to Canvas. Some of this was available during the summer when many faculty did take advantage of the opportunities. Unfortunately, Canvas and most every other online option falls well short of being able to serve Math and a number of other disciplines that utilize specialty symbols and notations. Many of the best features we would choose to use do not work in the "Quiz options" in Canvas. Additionally, there is no tool for writing our symbols and notations that come close to the human hand for speed and efficiency! Almost no one uses the pallet of symbols in Canvas due to the massive time requirements for even simple problems. There has not been training for how best to teach or provide math instruction, give assignments to students, or effectively assess students in any way beyond the lowest level skills.

1c. Now, in terms of goals, every department member is dedicated to improvement both in how we can offer instruction within a distance education format and also serve our students who are also struggling with these changes. As we are able to begin some face to face instruction, it will be likely that we offer some hybrid options that will definitely depend on how many students can be face to face at a time.

2. The budget cuts as well as the direct impact of COVID to education makes it nearly impossible for us to plan course offerings for our students. Basically, we are filled up completely right now but if the State's budget were to improve and 4-year schools begin to allow all students to return to face to face instruction, we would struggle to know how to adjust our offerings beyond what we did in the 2019-20 school year. Until such time as life more or less returns to normal, that will be our scheduling plan.

3. As was mentioned last year, how is it that we are supposed to adapt and improve when the district continues to move forward on several large projects and multiple smaller projects. We are under emergency operations yet the district is also treating us as if we can still function as normal. Additionally, AB-705 itself was, is, and will continue to be a massive project that requires much of our time. This is to serve our students!

4. Staffing:

4a. It may be that several full time department members will retire during the next few years but there have been no formal declarations yet and considering the financial times, this is no surprise. We did, sadly lose one of our full time hires last year but this was not due to work but to circumstances outside our control. This helped with regards to budget cuts and scheduling this year. If FTE returns, we will definitely want to pursue hiring.

4b. Math Center: While the Title III grant will support the program for several more years, it will take additional grants or alternative funding sources in order for the program to continue in the future.

**3. Special or Long Term Projects:** Here is a quote from last year's Department Plan, "What isn't a Special or Long Term Project right now? Everything is!"

The trend over recent years seems to be "Here is the next Special and high priority project!" Whether it be the state or the district, there is no project that appears to truly be valued long term as support (in terms of time and money) seems to wane as soon as there is another bright shiny object. This is not a statement about the nature of the projects themselves but only that at the highest levels, "Long Term" does not appear to actually be in anyone's vocabulary.

In many cases, we (colleges and/or faculty) are still being held accountable for tasks that are beyond our original contracted duties but with little or no means to make them happen.

This is not a sustainable strategy for a district that prides itself on planning. There is a limit to how much can be asked before we break under the strain. Here is a short list of some really significant items that are definitely "ongoing."

\*Emergency Distance Education! No formal training or resources for equipment when we started in Spring 2020 and most of the formal training that has ensued has helped with class management and general teaching strategies. There continues to be

almost no resources for more advanced Math courses. What little there is almost guarantees passing on a financial expense to our students. ...and it is difficult to see how or if we may return to normal offerings in the near future.

Almost every member of the department has spent personal money to try to make this happen. My own expenditures (Kevin) are probably around \$2500! The tools that were generously offered when March 2020 hit simply fell short of the actual abilities we needed them to have. Local IT has helped as much as possible and expenses would have been far greater if not for them. "You don't just simply move Math online." It should also be noted that the most easily accessible tools that can assist with assignments and basic assessments are almost a guaranteed expense in dollars to our students!

\*The New Bookstore!

The transition to a new books store was well underway when we converted to online in Spring 2020. However, we faculty were not generally aware of this and it certainly has cost us! The department was almost universally using older textbooks or materials printed at cost only. The expense to our students was minimal. e.g. A calculus book that was good for two or three courses only cost \$5 - \$20. Suddenly, a week before summer session, we find out that the new bookstore can no longer get this older edition, just a couple of days before the term was to start. We had to make decisions regarding a major aspect of our courses outside of our contracted work time! Again, many spent some of their own money to purchase more recent, but used books in order to keep the expense to students lower. In order for us to get instructor materials for 'free,' students would have to purchase a current edition which costs well over \$200! There aren't open source materials out there for most of our higher level courses. You might be able to find sources of instruction (at a huge time expense) but there won't be any problems sets available that are within copyright laws.

You should know (whoever is reading this), that many have adopted online support tools that do cost our students additional money. Writing math quickly using technology just doesn't exist. These tools generally only help with practice and lower level thinking skills. For us to get into critical thinking on a bigger scale, the students still need to write and submit their math. It is many times faster to grade a stack of actual papers than a stack of virtual ones. Again, we cannot afford this time with full classes like we have.

\*AB-705. Ok, we have implemented placements based on state requirements. This includes corequisite support courses for the most underprepared students. Now, let us consider that the professional educators weren't the driving force of the only legally allowed option (support courses) to help the underprepared students in order to "maximize the probability of passing a transfer level Math/English course in one school year." Nearly everyone in the department has studied "optimization" at the graduate level of Mathematics. AB-705 may have improved our 'numbers' but it doesn't satisfy the letter of the law yet our hands are tied and prevented from considering other options. It should also be noted that we (the faculty) never liked our placement exams in the first place yet laws forbade us from pursuing other options! ...and we are talked to as if the problem is our fault! (I really do hope that someone is reading this!)

Oh yeah! We need support in terms of both time and resources to investigate and improved upon this!

\*Our students don't have access to technology and it is even more apparent now in our emergency online circumstances.

\* Honors program for our students. A nice dream but is well down our list.

\* For many of our STEM students, there could easily be a strong relationship with our College Maker Space. "Book learning" is still needed but without hands-on opportunities, many of our students are falling short of where they could be (or need to be) for their majors.

\* Distance Education in STAT 300 was a rather big item last year. Now its significance seems like a joke to us. We are actually converting all of our courses to include Distance Education options as a preparation for the future. Some students, and certainly some faculty, may be compromised from full face to face instruction moving into the future and we are preparing for this eventuality.

\* Are we or can we be ADA compliant? In this digital age, technology happens to fall well short of the stated expectations but that does not lessen the need for us to improve. We do not have the capacity within our department to meet this need. To become compliant, it will require an outside specialist taking our materials and making them accessible. After the conversion is done, it will then require training for everyone on how to create compliant math documents so that we stay in compliance. General training will not suffice. It must be specific to the languages and programs that we use.

Everything stated here requires at the very least time but also other monetary support in many cases. We have none and the short term prognosis is certainly not good here!

**4. Department/Discipline Plans - Curriculum and Course Sequencing:** This list is far from exhaustive but is a good one for clearly identifying tangible items related to the department.

1. As part of the normal curriculum revision process, Math 310, 410, and 420 have been updated this fall (2020).
2. MATHS 80, our problem solving section for 1st semester calculus (Math 400) was updated based on student needs discovered in the previous year. This is only the second year of the problem solving sections and due to the combination of budget cuts and enrollment in our first two semesters, the 81 and 82 courses are not being offered in this school year. These would have supported students in Math 401 and Math 402.
3. Math 300, Introduction to Mathematical Ideas is in its inaugural semester at FLC. Two sections are being offered and one of these has a support class (MATHS 92). The placement model for this course is the same as for STAT 300 and thus meets AB-705 compliance. This course provides an option for many liberal arts majors that do not need a statistics course but do need to meet the Quantitative Reasoning requirement. We are pretty excited about this. Scheduling-wise, two sections of STAT 300 were converted to Math 300 and the total number of students served was not negatively impacted.
4. Our two permanent Math Center courses are going through the development process. LTAT (Learning, Tutoring, and Academic Technology) 30 and 31 are 0.5 unit lab courses that focus on helping our students to become better math students.
5. We will be offering one section of Stat 300 + STAT 10 (with support) in the summer of 2021 for the first time. This will definitely serve an overdue need.
6. STAT 101, Pre-Statistics will be piloted in Spring 2021. The objective is to allow students a two semester sequence to get through Statistics for those that cannot squeeze in the time requirement of STAT 300 + STAT 10 all at once. While still preferable to navigate students through the one semester option, there are students that for a variety of reasons may want or need to do it differently. A student successfully passing STAT 101 will then be able to take STAT 300 without support.
7. Students that are pursuing a Psychology Degree may satisfy their Statistics need through PSYC 330. The Psychology Department has created a support course (PSYC 10) to help underprepared students with their success in the transfer level class. An attempt has been made to have student placements include the PSYC 330 + 10 option but has not yet been successful. Information related to this course option is available on our Math Placement page of the college website.
8. Distance Education in our courses. At the beginning of the semester, the department unanimously voted to include DE options into all our courses. While not necessary in an emergency situation such as we are now experiencing, the department feels like the long term may warrant this type of flexibility. Both our students and our faculty may need options that allow school to happen while simultaneously dealing with health related issues or concerns. We want to be ready. Additionally, with the experience we are gaining now, there are students that were previously unreachable that may now have access. A schedule filled with on ground and online options is not out of the question so, again, we are trying to be prepared.
9. Scheduling classes definitely fits into the category of sequencing. Our plan for how department member schedules would be determined radically changed this last spring with the emergency shut down. We shall see what happens next year....
10. The New Bookstore! This definitely ties into curriculum development. The transition to a new books store was well underway when we converted to online in Spring 2020. However, we faculty were not generally aware of this and it certainly has cost us! The department was almost universally using older textbooks or materials printed at cost only. The expense to our students was minimal. e.g. A calculus book that was good for two or three courses only cost \$5 - \$20. Suddenly, a week before summer session, we find out that the new bookstore can no longer get this older edition, just a couple of days before the term was to start. We had to make decisions regarding a major aspect of our courses outside of our contracted work time! Again, many spent some of their own money to purchase more recent, but used books in order to keep the expense to students lower. In order for us to get instructor materials for 'free,' students would have to purchase a current edition which costs well over \$200! There aren't open source materials out there for most of our higher level courses. You might be able to find sources of instruction (at a huge time expense) but there won't be any problems sets available that are within copyright laws.

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11. STEM Math Certificate: This item will certainly be discussed elsewhere in the Program Review but it should be mentioned

that the vast majority of our STEM students simply do not require an Associates Degree before transfer. The lower division preparatory requirements are just too great and the four year schools provide a list of courses to be taken as well as minimum GPA in order to apply for transfer. In the meantime, many students have completed many math courses. This certificate can be earned by completing 16 units of transfer level Math (or STAT). Advertising for this program needs to ramp up now that it is available!

12. Below are a list of items from last year's department plan that nearly all were pushed to a 'back burner' due to the radical changes that have taken place this year. As stated in multiple other places. If the district/state truly values these then support needs to be provided.

\*The Department may be interested in participating in an FLC Honors Program that would involve courses at the 400 level if done.

\*The Calculus sequence for Biological Sciences (Math 355/356) is fully approved but due to all the AB-705 changes, has been put on hold for the time being. An additional hurdle here is the smaller size of our college and the fact that a number of 4-year schools don't accept this sequence, but only the traditional 400 level Calculus sequence. It is not anticipated that we will offer Math 355 or 356 during the next two school years.

\*There are a number of Course/Sequencing related items that need to be studied and possibly adjusted in the coming semesters. Here is an incomplete list.

\* How do we serve severely under prepared students? (Pre-Statistics, some type of summer Boot Camp, late start skills options, other?)

\* How many sections Fall vs. Spring should be offered? STAT 300, with or without coreq support, Business, STEM, the limited number of pre-transfer sections???

\* Do any other courses require support? (Intermediate Algebra, Pre-Calculus, perhaps optional?)

\* How do full time faculty rotate through scheduling choices in this new "STAT heavy" environment? Some variety is needed!

**5. Program Development & Revision:** 1. The STEM Math Certificate is now available to students! The first one was awarded this summer (U20)! Most of our students pursuing STEM majors will not pursue an associates degree. This can certainly be demonstrated by the lack of degrees awarded given how strong our enrollment is. In this fall 2020 semester, there were approximately 500 students taking a Calculus course (Math 400, 401, 402). These are unduplicated students! The vast majority of these students will transfer to a 4-year institution. We would have considered this "a success" not long ago! However, the state's new student success funding model will penalize the college for the success of these students if there is no official program to complete.

So why don't these students earn degrees already? The lower division preparatory requirements are just too great and the four year schools provide a list of courses to be taken as well as minimum GPA in order to apply for transfer. The students will earn 60 units with us but not complete a GE pattern during their time here. In the meantime, many students have completed many math courses as many STEM majors have a significant amount of lower division Math in their requirements.

The STEM Math Certificate is a way for us to capture a record of already existing success. This certificate can be earned by completing 16 units of transfer level Math (or STAT). Advertising for this program needs to ramp up now that it is available!

It should be noted that we actually have seen an increase in degrees awarded. Last year, there were 30 Math degrees given. The feeling in the department (and the enrollment supports this) is that we could easily be awarding well over 100 of these certificates each year! Again, finding a way to advertise becomes much more important now.

There is still an interest in creating some type of Math or STEM honors program but given the other projects and circumstances, this is well down our list to be able to take on.

**6. Percent of SLOs assessed:** Every course that was offered before Fall, 2019 has had most, if not all, of its outcomes assessed. The last three plus years have literally been a scramble that began late in the fall of 2017 with the passing of AB-705. Many significant projects, including assessing SLOs have been put on hold.

Every single member of the department writes assessments within their own classrooms that are designed to meet our outcomes but we have no new data to work with now.

Someone needs to slow the world down a bit if there is an actual interest in determining how much students are learning. It is difficult to imagine trying to squeeze this project. This is a reality, not a complaint.

Related to AB-705, the expectation was that throughput (total number of passing students) would increase but the pass rates would drop. This basically means that for courses such as STAT 300, we would need to start from the drawing board (actual thinking and planning) when it comes to course outcomes. Incidentally, the data from year one of AB-705 does demonstrate that throughput went up but pass rates dropped.

**7. Course SLOs - Synopsis:** Continuing our common theme, if there is actual concern for our student's outcomes, the authorities beyond our college need to stop implementing change and also provide ample time and support for us to be able to act. The rate we are moving, something might actually work and be extremely beneficial to our students but we will never have the chance to notice because we are being kept too busy. Staying busy is not the same as carefully observing, thinking, and experimenting.

There is a conflict between the student success funding model and learning outcomes. On the one side, we are paid (in part) for students passing our classes. On the other side is a real interest in determining where students struggle and modifying our instruction methods to bring them up to their highest possible level of achievement. Most will tell you that the dollar signs are winning!

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Here are some observations from last year's department plan.

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(Previous ADP)

There is a significant push from the state and district to improve 'throughput,' which implies pass rates. This is not necessarily a stance that supports learning outcomes and we implore our college to continue to fight for "learning" over "passing."

Additionally, all students have access to transfer level regardless of their preparation to enter college level coursework. We anticipate that course outcomes will reflect this. Besides struggles with course content, we are already seeing a huge array of other deficiencies students have. These include, but are not limited to, time management, note taking, organizing their own written information, reading for comprehension, and studying (actually learning the material).

**8. Course SLOs - Strategies for Improvement/Maintenance:** Here is a perfect example of something that used to be more highly valued but is now pushed so far down the list that we have not assessed any course outcomes in the last three school years! By itself, this is a massive undertaking that actually takes up instruction time that we do not have enough of as it is.

If you were to survey the professors during a time we were providing instruction face to face, they could tell you quite well where their students were stronger or weaker. To create an additional tool to help us measure (inaccurately, we might add) outcomes is a huge loss of time and energy. We all teach and assess differently. That is a positive! Students can search out instructors that best fit their individual needs. Anyone saying differently has already forgotten their own undergraduate years! ...and we did it without Rate My Professor. Anyway, back to the point (is anyone reading this?), our assessment tools must be easy to score because this is an outside of our class and time project. That means students are taking an SLO assessment that they are unaccustomed to so the results will be skewed against the student.

None of this matters though since the last two school years plus this one are completely dedicated to other projects or situations (AB-705 and moving to emergency online instruction). Students are also pushed beyond their limits and trying to fit these assessments in is not within their bandwidth.

Now for a much harsher statement. Is the district or state even interested in learning outcomes now that a substantial amount of our funding is based on students passing Math and English in their first year?

There are so many professions, including many that are not STEM related, where the ability to quickly and precisely work with numbers is tantamount to being employed! From personal finance, bidding on contracts in the trades or business sector, planning budgets, and doling out resources and supplies to people in need, if you cannot do the math well, you are hurting yourself and/or others! We Math Professors are rather partial to the subject and are greatly disappointed when it is poorly used and especially when it is used to motivate and persuade people with inaccurate information.

The Department has not been completely wallowing around in self-pity (Is someone reading this?) Nudged forward by our Dean (Greg McCormac and following the lead of our outstanding science faculty, a project has begun to help address the needs of students that are now thrust into transfer level math/stat that would previously have started below transfer level. The Math Center is a program currently dedicated to helping develop a student's "student skills." Their math skills may not be the greater cause of failure but other factors may play this role. Here is a short list to consider.

Student skills of note (not an exhaustive list).

- \* Time management
- \* Note taking
- \* Organizing their own written information
- \* Reading for comprehension
- \* Studying (actually learning the material)
- \*...and brand new, starting in 2020, is "functioning as an online student!"

Marc Olsen is currently our lead for the Math Center with several other full time faculty serving as student mentors in the program. We are now in our second semester with new, permanent courses (LTAT 30/31) on their way for Spring 21 and beyond.

**9. Program SLOs - Synopsis:** We have almost no formal feedback on program outcomes. Indirectly, all faculty have some communication with former students. If anyone is hearing reports of how we "did not prepare them for transfer," no one is sharing. Personally, I have never had this from any student and I do occasionally ask questions regarding the preparation I try to provide.

As stated elsewhere in the Program Review, is there any actual interest in looking at the outcomes of programs? More specifically, nearly all our courses have content defined by the 4-year schools. The outcomes are not of any true creation of our own but simply following the articulated expectations of the CSU and UC systems, not to mention private institutions as well sometimes. And, it should also be noted, we are happy to do this.

**10. Program SLOs - Strategies for Improvement/Maintenance:** There are currently no methods for assessing our program learning outcomes. Right or wrong, this task has been kicked way down the list due to all the other changes over the last few years. Additionally, all of our STEM, Business, and Statistics content is dictated by the 4-year schools so changing or "improving" our outcomes is just not something that we have the right to do.

The state's push to fund us on program completers and students that pass Math and English in their first year compounds the difficulty we have in assessing outcomes. Passing courses and awarding programs is suddenly a significant part of our funding model. Is there someone out there that is truly championing what students are learning? This is a harsh, but seemingly real statement.

One thing that we would like, and the college would likely agree with, is to have accurate records of our students that have successfully transferred to 4-year schools. The vast majority of FLC students declare transfer as their goal and just knowing that they "safely got there" is pretty rewarding.

Our new STEM Math Certificate is something that many students can earn within their transfer plans and hopefully the college will be able to utilize this as well. The specific Math/Stat courses that a student needs to take for transfer varies depending on the major but we know that there are many students that need to take at least 16 units of these courses. This definitely constitutes a success for the college and we are excited to see how this may impact the landscape!

Again, as stated in other parts of this Program Review, if the state and/or district feels strongly about the details of what our students are learning (outcomes), then it will need to become more apparent to us in the classroom.

**11. Improving Course and Program Success Rates - Data Analysis:** There really has been measurable improvement in the number of Math Degrees awarded! The last two years has shown 24 (2018-19) and 30 (2019-20). Considering that the majority of our STEM students do not pursue an associates degree for transfer, we are pleased with this.

In the last 5 years, the number of sections of transfer STEM Math courses has approximately doubled. Enrollments are 100% full in most cases. The students are here and they are anxious to pursue a wide variety of Science, Technology, Engineering, and Math options.

Course success rates in Math are higher than 5 years ago but lower in Stat 300. This is not surprising as AB-705 basically has "moved" many of our basic skills Math students to STAT 300. During the 2015-16 school year, 509 passed Statistics. During the 2019-20 school year, the number of students that passed was 1011! Far more students are not placed into transfer level math but the pass rate is over 10% lower than before. The objective of the law was to improve the throughput and that definitely has been achieved. This demonstrates that many students are able to take on the transfer level course but there are definitely some that are not ready.

Most sub populations of the college have seen similar changes during this time period but the results are not consistent. In

some cases, there just aren't enough students in a group to utilize macro scale percentages to "study the results." (FLC Data Dashboard is the source.)

Currently, corequisite support courses, tutoring, embedded tutors, and our new Math Center are the active strategies in place to support our students outside the classroom, including the virtual one.

We faculty are interested in looking for ways to improve student success but the state/district will have to stop pushing new ideas or projects if they want us to actually have time to think, plan, and implement strategies. We are the teachers, the ones that actually do work with the students and a result of continually pushing new projects our way, even worthy ones, is that nothing new can or will get done.

While our emergency online transition is no fault of the state or district, our faculty are struggling to try to provide online instruction that still pales in comparison to what we can do in the face to face environment. Our curriculum has not shifted one iota. We are bound to present exactly the same material as we were before. From our homes, with remote tech support, without the resources in our offices, with kids and partners at home doing "school" and work, with students who are struggling to maintain their own equilibrium. In the meantime, we are still being asked to implement new strategies, use unfamiliar technologies, and build better bonds with our students in a modality that is contrary to it all! With 120 students or more, if half ask for a personal zoom session, you have two weeks of full time work lined up. Every question, every email, every glitch with Canvas, every power outage, every request for leniency on deadlines eats up hours of work.

In case the readers of this have not heard it, beyond the basic skills courses there are practically no online models out there that can come close to the expectations of these transfer level courses. In the areas of critical thinking and problem solving, we are no longer able to do this at an acceptable level. Virtually (like the word choice here) every training we have had falls into one of two categories. First, general best practices for online instruction. In this area, the department has hungrily pursued and grown! Second, "hints" of ways we "might be able to implement" teaching and assessing content in our Canvas based online environment. There are no entire course models and when good ideas have come up, the implementation is not feasible. We are talking either monetary expenses or hours, in terms of dozens or hundreds of hours, in order to even begin to make our online courses approach the level of quality we had when on ground.

Just thinking about some of these things is exhausting and frustrating. It is not all bad, of course and in terms of capturing student program successes, there is definitely a plan. The following item appears in multiple sections of this Program Review.

The STEM Math Certificate is now available to students! The first one was awarded this summer (U20)! Most of our students pursuing STEM majors will not pursue an associates degree. This can certainly be demonstrated by the lack of degrees awarded given how strong our enrollment is. In this fall 2020 semester, there were approximately 500 students taking a Calculus course (Math 400, 401, 402). These are unduplicated students! The vast majority of these students will transfer to a 4-year institution. We would have considered this "a success" not long ago! However, the state's new student success funding model will penalize the college for the success of these students if there is no official program to complete.

So why don't these students earn degrees already? The lower division preparatory requirements are just too great and the four year school just provide a list of courses to be taken as well as minimum GPA in order to apply for transfer. The students will earn 60 units with us but not complete a GE pattern during their time here. In the mean time, many students have completed many math courses as many STEM majors have a significant amount of lower division Math in their requirements.

The STEM Math Certificate is a way for us to capture a record of already existing success. This certificate can be earned by completing 16 units of transfer level Math (or STAT). Advertising for this program needs to ramp up now that it is available!

**12. Improving Course and Program Success Rates - Strategies and Resources Needed:** The Pathways, or Program Maps, concept will definitely provide students (and counselors) with a way to conceive of working your way through an entire program. The department has maps for Math specific degrees, the new STEM Math Certificate, as well as interdisciplinary programs. These are a good starting point to try and determine what should a student's schedule look like in order to complete a program in two years.

There could be some minor modifications to these as students don't always begin their "math journey" at the same course as this is determined by how far they went in STEM preparation before they came to the community college. The department will follow up with the Program Maps group to consider some options.

Currently, corequisite support courses, tutoring, embedded tutors, and our new Math Center are the active strategies in place to support our students outside the classroom, including the virtual one.

There is always a need for Tutors and more of their hours. It may be that in this online environment, methods are being employed that may help with their limited space issues once (if ever) we resume on ground operations again.

We faculty are interested in looking for ways to improve student success but the state/district will have to stop pushing new ideas or projects if they want us to actually have time to think, plan, and implement strategies. We are the teachers, the ones that actually do work with the students and a result of continually pushing new projects our way, even worthy ones, is that nothing new can or will get done.

The Mathematics Department is most definitely in favor of receiving training. There are multiple reasons why training, and implementing it have been issues. First, our teaching calendars for any course in our catalog are completely filled. Taking one or two days of instructional time to attend a conference or specific training just doesn't work. We don't have enough days/contact hours as it is and we thoroughly plan out our teaching calendars way before a semester begins. The content we cover is generally needed in the next course so finding places to "trim" is difficult, at best. When we find out about the training after the semester has started, it is just too late for us since there are no "flexible days." This includes what happens during Flex week.

We can and do make small improvements as a semester transpires but taking away from the term is generally speaking, "out of the question." There have been exceptions but it is usually quite difficult (or impossible) to have time and energy to share with the department. It has always been this way. It takes time for ideas to be able to filter through.

\*We could use financial support to attend events outside of the semester.

\* Faculty that are able to attend need to be supported once they return in order to best disseminate information to the department as a whole. Perhaps taking what they have learned and finding some way to document and/or record it for others to use when they are actually available.

\*Simply finding examples of courses/programs that can be emulated has been a challenge. Many of our courses seem to "not have models" out there. Someone has to be doing something more innovative?! If there are models out there, can we find a way to get someone there? If so, is their content reproducible? Does it cost our students?

\*Whether it be online instruction, good examples of corequisite support, more equitable instruction, we need help finding it.

In the category of specific strategies we know about, additional tutoring or embedded tutoring is definitely something our students need and desire. The Title III grant that the college was just awarded should make a difference.

We are a long way off from knowing how to best support underprepared students that are thrust into transfer level material and the forced emergency online instruction has definitely changed our landscape. Having said this, the department faculty are all stepping up and expanding their own skill sets substantially. The results will get to our students, whether it be "flowing" or a "trickle."

The Math Center looks like it definitely will be serving enough students to make it a worthwhile endeavor. With our first lead (Marc Olsen) and several full time members serving as mentors during the first two semesters, some traction is taking hold. This does involve a modest amount of FTE and needs to be included here.

A dedicated space on Campus for the Math Center is definitely something that is needed. If the success of the program grows to be similar to that of the Science Center, FLC facilities will fall short of the need. ...if we ever meet on campus again!?

As always, we cannot thank our Learning Skills Department enough. Sam Raskin is nothing short of amazing! ...in case anyone reading this did not know that!

When we do go back to the classroom, items like basic classroom supplies and the ability to make copies will again be needed so it seems important to make certain that they are included.

DSP&S testing hours may be an issue again as well. (evenings and Fridays and some "odd hours," not to mention our Centers.)

**13. Suggestions for Improving the ADP/PR process:** Repeating what was in our ADP last year, this seems to be an effective format to use but it would be nice if the ADP/PR were the primary focus for the department, not one of multiple 'big' projects that is relegated to "way down the list."

**14. Is your ADP complete and ready for review by the Dean and Vice President?:** Yes

**Program Review Questions (skip if not completing program review)**

**15. Mission Statement:** Our fantastic OIR people helped to track this item down. To be honest, it is unlikely if any of the department is aware that a written Math Mission Statement even exists. It is shown below (2012-13).

If you were to individually poll us regarding our mission statement, you might have responses such as:

We will use our existing, and constantly growing, skills and experiences to do the following.

\*Help students through all, or nearly all of the topics we are required to cover in our courses. (This is our primary role, FYI)

\*Help the students to grow and develop as students (learners) with skills such as time management, notetaking, practice makes perfect, and presenting information to others that may or may not have the same level of understanding.

\*Show them how it is possible to love learning and it is something to be valued, even if it is not your favorite subject (...true for all disciplines, right?)

\*Help as many students as possible navigate through some of their own struggles. This includes directing them to college resources. We will always fall short here as there are only so many hours in a day and we can guarantee the number of student needs far exceeds our hours of availability.

So, you can use this statement above for a make shift mission statement that was not voted on and definitely did not benefit from wordsmithing by the department or you could use the old one shown below that not even I (Kevin) remembered.

Previous\*\*\*\*\*2012-13

The mission of the Mathematics Department at Folsom Lake College is to:

1. Provide high quality instruction, delivered in such a way as to optimize student success by:

- Working as a collaborative group to improve the instructional delivery and curriculum used by the Department
- Providing clear expectations, consistent standards, and frequent feedback for the students
- Consistently analyzing delivery methods, curricula, and use of class time
- Creating an open and safe learning environment
- Encouraging students to learn and pursue the study of mathematics
- Being sensitive to and taking into consideration the culture, and learning ability difference amongst the population of students

2. Develop students with the skills and abilities required for future success in mathematics education in general and the work place by:

- Maintaining high standards for classes of all levels
  - Teaching students how to learn from reading a text
  - Teaching students how to use critical and deductive thinking to solve mathematical problems that are based on real life applications
  - Teaching and encouraging students to be responsible for their own learning by preparing for class in advance, taking notes, and keeping records of their progress
  - Creating atmosphere of trust that encourages and allows students to work individually and in groups
3. Create an open and stress free environment for faculty by:
- Respecting differences in teaching styles, understanding the differences among faculty, and working through those differences as needed in a respectful manner

**16. Pre-Requisite and Co-Requisite Validation:** All courses under Math or STAT have either been revised or are new within the last 6 years.

All course prerequisites fit under the categories of "a sequence of courses" or satisfying articulation needs (such as STAT 300). At the transfer level, prerequisites for courses at the transfer level also match requirements of the CSU and/or the UC systems. There are several courses with corequisites on them. These courses fall into two distinct categories, both with primary aims of boosting student success! Several courses have corequisite support classes to help students that may not be well prepared to begin at the transfer level. These have been implemented to help meet the needs of AB-705.

The other courses with corequisites on them are part of our new MATH Center. In the last year, an experimental offering (Math 299) was created to give students a way to boost their "student skills" in relationship to taking college level Math/Stat courses. Students must be in a Math or STAT course as part of the requirement for taking the Study Skills in Math courses.

While this program review is being written, the two permanent courses for the Math Center are under development in the LTAT designator in coordination with our learning skills department.

**17. Maintaining Program Currency:** Defining the department's catalog of courses as a program is a rather interesting statement compared to a many programs within the college. On the one hand, students definitely need to meet a quantitative reasoning requirement in order to graduate locally or to earn a transfer degree. In that sense, most students are taking a course that meets a need for another program.

On the other hand, students working towards Business or STEM degrees may need to take several Math courses as part of the lower division preparation for transferring in these majors. These students are also "not completing a program." We will come back to this group in particular though.

We have seen significant growth in the number of students that are actually completing Associates Degrees in Mathematics! From the 2014-15 year with 10 completers, we had 30 students earn Math Degrees in the 2019-20 school year! Now we in the Math Department see this as only scratching the surface for the Program's potential. The vast majority of students in STEM will transfer without earning a degree here at the college. The lower division preparation for their majors has too many courses to also complete the full GE pattern. These students will finish their general education while simultaneously completing their 4-year degrees at the university level. In the meantime, they will have taken quite a bit of Mathematics with us.

Beginning this school year (2020-21), we now have the STEM Math Certificate available to any FLC student that has completed 16 or more units of transfer level Math/Stat. Since the college is now receiving part of its funding based on "completers," it has suddenly become important to be able to acknowledge the fact that we are a very large program. Our increased enrollment in transfer level courses, especially at the 400 level is indicative of how many STEM majors are here. These students are studying Computer Science, Engineering, Economics, Physics, Chemistry, and Biology, to name a few big transfer goals. We began with approximately 500 unique students in just the Calculus sequence this Fall 2020 semester. Most will not be able to earn a degree or certificate before they transfer but should be considered FLC successes! The plan is to heavily advertise the STEM Math Certificate before they transfer.

**18. Evidence of Program Relevancy:** The relevancy of the program definitely can be evidenced through our numbers, ironically. In the last 5 years, we have doubled the number of 400 level courses offered each semester. These sections were well enrolled in Fall 19 and they are nearly 100% enrolled in Fall 2020. There are students that need the Calculus sequence, Linear Algebra, and/or Differential Equations in their STEM Pathways! For some students, they must complete preparatory Mathematics not taken in high school in order to take the Calculus sequence and for some majors, the traditional Calculus sequence may not be needed. Business majors may fall into this particular category. Our Business Calculus offerings have tripled in the last 5 years which shows another group of students we were not able to meet the needs of before.

**19. Is your PR ready for review by Dean/VP?:** Yes