Program Review 2021-2022

Mathematics

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A. **2021/2022 Program Review** (Form)
B. **Summary Fall 21 Turned in Feb 6.xlsx** (Excel Workbook (Open XML))

Form: "2021/2022 Program Review"

Created with : Taskstream
Participating Area: Mathematics

2021/2022 Program Review

(REQUIRED) Name of Lead Writer and Manager/Service Area Supervisor
Francisco Javier Marquez/Sandra Belew/Ken Kuniyuki and Dr. Paloma Vargas

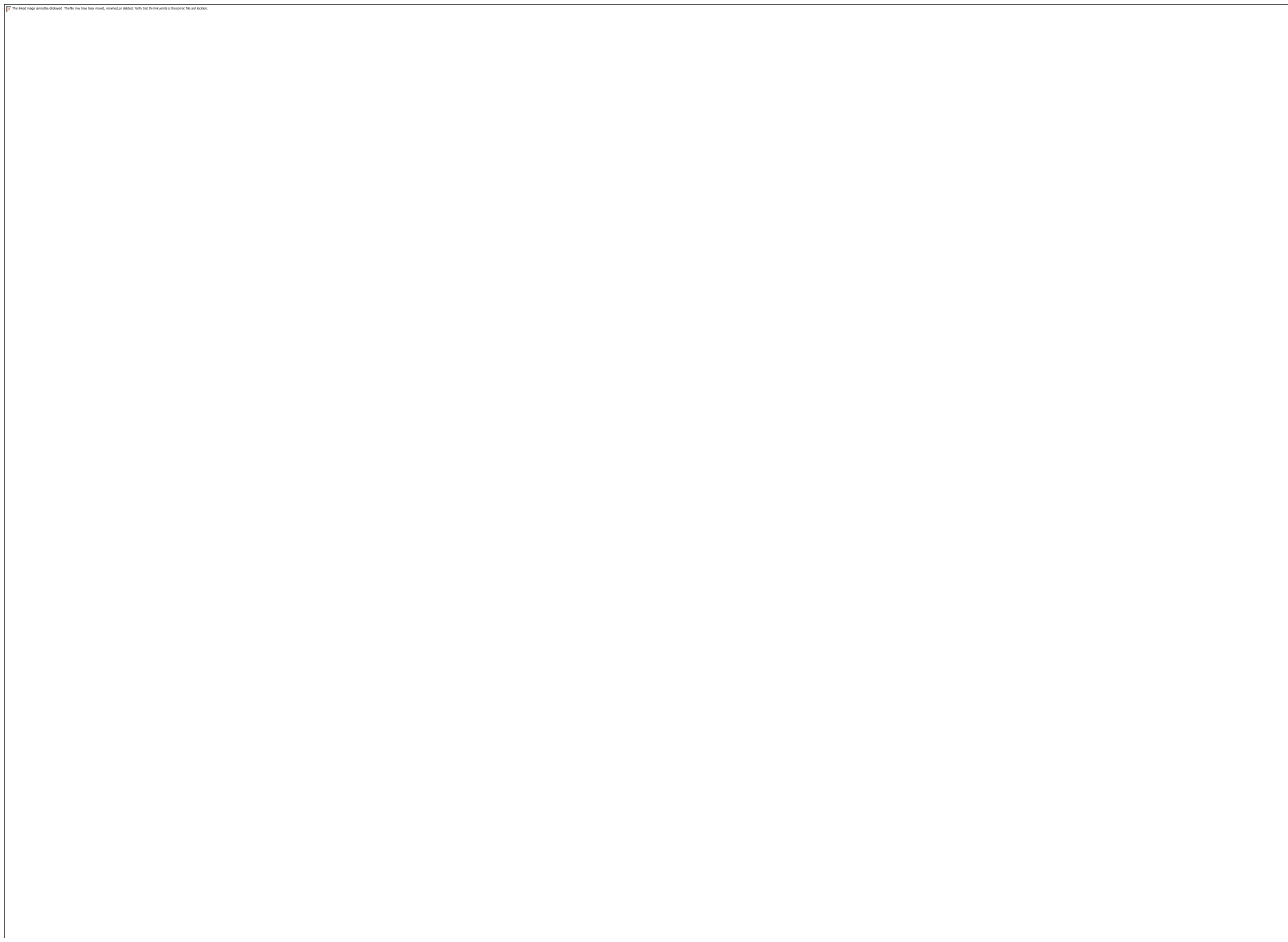
(REQUIRED) In what ways (if any) did changes to an online/remote modality due to COVID-19 impact student success and equity in your area/program? Please provide evidence.

With much hard work, the math department has successfully made the jump to the online formats necessitated by COVID-19; the technical training of our faculty has greatly assisted in this. Nevertheless, we have concerns about continuing fully online formats beyond COVID-19. Student success rates have been higher during the COVID-19 terms in Math and MNS generally, whereas they were flatter across campus. During the Fall 2019, the overall success rate for math was 60%, this jumped to 64% during (COVID-19) Fall 2020. Similarly, success rate for math was 61% for Spring 2019, then 67% in Spring 2020. As a comparison, the overall success rate for Mesa College remained statistically flat, between 72%-73% during Spring 2019, Fall 2019, Spring 2020, and Fall 2020, thus indicating some pronounced difference in success rate for Math Students, as compared to general Mesa Students, during COVID-19. Students may have benefited from the greater flexibility provided by online formats (synchronous and asynchronous), although we share the concerns that other STEM departments have had with respect to academic integrity. Instructors have had to work hard to maintain the quality of their courses in the jump from on-campus to online formats. Some of this work has been to create new forms of Assessment in place of the traditional exams given.

Since this rise is success rates does not seem to be replicated across the Mesa Campus, it is likely that the modality change to

(mostly) online classes, online quizzes, and online exams favors math courses slightly more than general courses.

When analyzed by ethnicity, the changes are more nuanced. Starting with Spring 2019, and for the following 4 semesters, the success rates for Black Students were relatively flat, at 51%, 55%, 54%, 53%, and 53% respectively for each of the 5 consecutive semesters. Black students saw little or no difference during the change of modality. Similarly, for Latinx and Filipino students remained relatively flat at 56%, 53%, 59%, 61%, 59% and 64%, 62%, 65%, 69%, 63% respectively. Pacific Islander/Hawaiian Students showed more variance at 54%, 65%, 57%, 35%, and 55%. Asian and white students showed the most pronounced increase in success rate at 71%, 69%, 76%, 82%, 79% for Asian students and 68%, 69%, 69%, 74%, 74% for White students. The change in modality has had a deleterious effect on our students of color and has created even greater equity gaps. The reliance on technology and having a space to participate in class from home has had a huge impact on our students as is evidenced by the chart below.



While overall math success rates have been increasing, several of our gateway courses have experienced decreasing pass rates. The courses with descending pass rates are Math 92, Math 116X, Math 118, Math 119, and Math 119X. These courses typically involve either more collaborative work and/or more technology. Going forward, we plan to prioritize support for these courses.

(REQUIRED) What practices has your area/program implemented since the last program review cycle that you would like to improve/continue? Identify impacts on student success and equity.

MT2C tutoring and Peer Mentoring. These programs can have a big impact on student success.

MT2C tutoring is still effective online, but many students are not utilizing it. In 2018/2019 over 10% of our math students were attending tutoring services. In Spring of 2020 it went down to 6.4% and in Fall 20 even further to 4.1%.

STEM tutoring appears to benefit students across ethnicities. For example, in Spring 2021 Latinx students receiving STEM tutoring showed a success rate 12% higher than Latinx students not participating in STEM Tutoring (81% vs 69%). The STEM tutoring advantage for Latinx exceeded the non-Latinx advantage, which was only 7% (86% vs 79%).

In looking back to Fall 2019, our last semester fully on campus, the success rate for Math 92 students receiving tutoring went from 57% to 80%. Similarly, for Math 119, it went from 58% to 73%, and for Math 151 it increased a dramatic 30% from 43% to 73% success rate.

As part of the HSI grant, Peer Mentoring for the STEM Calculus Sequence began in Fall 2019. Peer Mentoring is offered to Math 150, 151 and 252 students. As with attendance to the MT2C tutoring session, we have seen a decline in attendance to the Calculus Peer Mentoring sessions. This last semester we offered primarily virtual sessions plus one weekly session on campus.

In the last 2 years, mentees who regularly attended the mentoring session showed large gains! More specifically, our **Latinx mentees** that attend 10 or more session in the year out-performed

the comparison group by 18%, with the Latinx students at a 90% success rate while the comparison group was 72%! Furthermore, the pass rate for this group was 11% over the overall pass rate. See the chart below.

Both MT2C and the Peer Mentor Program have Math Liaisons to assist with the training of the tutors so that we can best support our students. Professor Katherine Naimark is the MT2C Math Liaison and has helped to increase the mathematical testing and training of all new math tutors. Professor Sandy Belew has been the Math Liaison for the Peer Mentoring since 2019 and we are now bringing on Professor Sharon Hughes as a second Math Liaison. The **new STEM grant** is helping to fund the expansion of Peer Mentoring.

While we would like to continue and improve Peer Mentoring for Calculus, we note that attendance was low, and **increasing attendance** is a primary goal.

(REQUIRED) What practices has your area/program implemented since the last program review cycle that you would like to change/discontinue? Identify impacts on student success and equity.

We would like to change the proportion of on-campus classes. 77% of those who dropped out during COVID-19 noted access to technology as one of the reasons for dropping out. Having more on-campus classes would help affected students. Moreover, transitioning back to a traditional, on-campus modality will greatly improve student-instructor interactions, overall learning, and likely improve academic integrity.

For Spring 2022, the percentage of On-Campus course will increase to 56% from only 10% in Fall 2021. The equity gaps are expected to be improved as the proportion of on-campus classes is increased and those with technology issues get some relief.

In-class tutoring (CT) is a great benefit to those students who are able to have one attached to their class. The CT attends class and helps with student group work and has tutoring sessions after the class. This allows the students to make a personal connection with a single person(tutor) rather than having to go to a random Zoom session or walking into a room with unfamiliar faces.

We would like to see the CT Program can be expanded to cover more math courses with particular focus to courses that have seen decreases in pass rates. Many of our students have been doing remote learning for the last two years and returning to campus and taking exams is creating anxiety that can be alleviated with having the additional resource of a Class Tutor.

(REQUIRED) What college-wide practices implemented since the last program review cycle have affected your area/program positively or negatively? Identify impacts on student success and equity.

While vaccinations may be beneficial, the vaccine protocol has affected our students negatively. The protocols and the implementation thereof have been imperfect and has caused much confusion amongst students and faculty. The monitoring protocol for vaccination status is still in flux, with faculty receiving faulty messages stating that students are not cleared, when in fact they are. A clearly-communicated protocol for students and faculty would help mitigate the confusion.

Access to a good place to study is also a college-wide issue affecting our students. Those with fewer resources have less access to quiet areas where they can focus on studies. The LRC helps, but often the scheduled hours of operation do not align with the times our students need to work. Additional hours and later hours of operation for the LRC would help. Expanded hours for students to study in the MS-100 building would also help, and these study spaces should be advertised. The students most affected are ones with limited access to areas conducive for studying.

Faculty are concerned that poorly prepared students are getting passing grades and are being inappropriately passed on to the next course. This affects students in all STEM disciplines. Faculty from other departments have noted that students with fulfilled Math prerequisites do not have the expected Math skills to do well in their courses. The increased proportion of on-campus modality courses and those having exams on campus could help to improve academic integrity and related issues.