Active Learning Activities in Calculus Class

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INTRODUCTION
In fall 2020, I implemented the active learning Calculus activities in Calculus classes. Students in calculus classes have participated in these hands-on activities. I always believe that Mathematics need to be taught showing its connections to other fields. So, I plan on connecting the class with the community through the projects. This presentation will highlight strategies to promote active learners and problem solvers through hands-on activities in a calculus course. The primary objective is to foster student reflection by creating an experience, choosing a real-world problem for the community, and solving the concepts learned in the classroom.

OBJECTIVES
For the students:
- Improve students’ ability to connect classroom knowledge to outside world.
- Improve student’s ability to reason independently from a deep understanding of concepts to answer questions and solve novel problems.
- Strive to push students beyond the traditional approach to learning mathematics by broadening their problem solving abilities and strengthen their critical thinking skills.
- Exposure to mathematical modeling problems that arise in community.
- Develop real world problem solving skills that are valued by employers.

For the instructor:
- Promote student engagement through the active learning strategies
- Promote collaboration between faculty with different expertise
- Provide the immersive mathematical experiences using the Project based approach by connecting it to real world problems.
- Increase awareness among faculty on connecting classroom to the community.

ACTIVITES

ACTIVE LEARNING CALCULUS

- Newton’s law of cooling - coffee cup & Thermometer
- Maximization problem Amazon Box & measuring tape
- Minimize the area - Window problem
- Maximum revenue - Football game, Movie Theatre
- Euler’s method problem - Computational work
- Amortization - Car loan, House loan
- Minimize the area - Garden problem

CALCULUS WORKSHEETS

After completion of each chapter in Calculus, students will be given calculus worksheets to work as a team. These activity sheets improve student learning by stressing conceptual understanding rather than memorization of procedures and give them an opportunity to understand and connect the concepts to real life applications. Also, it promote student thinking to see how challenging yet interesting some of the basic concepts of the subject material can be. (Source: http://math.colorado.edu/activecalc/)

PROJECT IMPACT

- This project will improve student learning by stressing conceptual understanding rather than memorization of procedures and give them an opportunity to understand and connect the concepts to real life applications.
- This project will promote student thinking to see how challenging yet interesting some of the basic concepts of the subject material can be.
- It would take students beyond the classroom by enriching their learning experience and will greatly improve students’ abilities in Problem solving, Critical thinking, Independent thinking, Communicating, the traits and skills that are most valued by employers.

WHY WE NEED TO DO THIS?

- When students go for the job interview, the interviewer will not ask the students to go to page number 49 and do problem 7. They will ask them what did they learned from calculus and how do they implement that knowledge into the current project.
- During this process, students will learn more about the concepts and help them to know how to connect with the outside community.
- More important fact is that the students will have fun during this process and no more math is hard and boring. (very engaged classroom)

For questions please contact buna.sambandham@dixie.edu

SKILL SET

- Students presenting to the class would have an opportunity to improve their presentation skills.
- It will enable them to learn to explain a concept in different ways, and see which explanation is more reasonable.
- At the same time, they will be honing their ability to communicate verbally and improve their ability to present information visually in a simple way.

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