



Divisional Strategic Planning Brief – Mathematics

Campus Outcome:

Develop and design strategic campus curriculum including associate degree programs, pre-majors, certificates, and courses to align with community, student, and workforce needs, including exploration and establishment of needed bachelor's degrees. Goal: Learning Assured Objective #6.

Department Outcome:

Promote and participate in outreach programs within Valencia. Goal 3: Invest in each other.

BACKGROUND & DESCRIPTION

In summer 2016, the Valencia Fire Science Academy was preparing for their new A.S. in Fire Science Technology. The program needed to include a mathematics course that would fit cadets' needs, and have high success rate to prevent cadets from dropping out of the cohort based model.

Professor Dr. Joshua Guillemette collaborated with Professor John Glass of the Fire Science Academy, and the East Campus Dean of Mathematics to adapt an existing course to meet the needs of the program, while still meeting the course objectives as defined by the state. The team decided that College Mathematics (MGF1106) infused with fire combustion formulas, quantitative reasoning, and additional algebra would best suit the program while meeting the course requirements.

INTERVENTION

Dr. Joshua Guillemette used three strategies to support student success: relevance, proactive advising, and an appropriate assessment plan.

The first strategy was to deliver the College Mathematics content relevant to the cadets. Fire combustion formulas were infused into the course. Critical thinking was emphasized in the logic section. The statistics topic was introduced through a fire science journal article. The required geometry section developed around fire load and building dimensions. While firehouse ideas were not present in every example, they appeared through the semester so cadets understood the mathematical relevance.

For the next strategy, the Fire Science program director, Professor John Glass became the proactive cadet advisor. Research indicates that “Good advising is the single most underestimated characteristic of a successful college experience” (2001, p. 81). Proactive advising includes strategies to identify students who are at risk academically, reaching out to those students and advising them of college services or resources that will assist the student in succeeding (Schwebel, Walburn, Klyce, & Jerrolds, 2012). Dr. Guillemette worked with students to ensure success but also contacted Professor Glass regularly to inform him of those cadets that needed additional support. Professor Glass then spoke with the cadet to determine the necessary support. Closing the loop, Professor Glass then reached out to Dr. Guillemette to convey the outcome of the meeting. This intervention proved to be successful and achieved the department goal of investing in each other.

The last strategy involved the assessment plan. During both Fire Science I and Fire Science II, students could do homework after the due date for half credit. This encouraged students who fell behind to get caught up and seek help when they didn’t understand the material. Many students took advantage of this opportunity and it helped their overall average. One aspect that changed from Fire Science I to Fire Science II was informed by the work of Professor Alison Hammack. She led an Endowed Chair funded research team on exam second attempts (WIN Exam plan, The Grove, 2017). Following these ideals, the cadets were given a chance to improve their exam average; 6 of 17 cadets took advantage of the opportunity and improved their final grade by one letter grade. Another cadet was able to increase his grade by one letter grade by redoing homework assignments.

STRATEGIC RESULTS

The course was piloted in fall of 2016. The enrollment of the class was 21 cadets and the program experienced only one withdrawal due to an injury. The remaining 20 cadets persisted to finals and passed the course. Professor Glass informed the department that the College Mathematics course had the highest pass rate of all courses in the program taught in the fall term. This was seen as a great success, as the leadership feared that the course would lead to low levels of retention.

Fire Science II began in fall of 2017. Eighteen cadets began the course and the program experienced one withdrawal. All the cadets who took the final passed the course.

At this time, Fire Science III is scheduled for the fall of 2018 and recruitment is underway now.

Table 1: Retention in Mathematics and Program

Program Year	College Math Retention	Fire Science Retention
Fire Science I (Fall 2016)	95.2% (20/21 cadets)	81.0% (17/21 cadets)
Fire Science II (Fall 2017)	94.4% (17/18 cadets)	94.4% (17/18 cadets)

REFLECTION

The success rates and retention rates are considerably above the average for this course college-wide. The proactive advising and updated assessment plan appear to be helping student success. A review of the curriculum should be conducted to improve relevance and make sure students have the required algebra skills and quantitative reasoning abilities needed to be successful in the program and any transfer plan.

NEXT STEPS

Include more relevant content in the curriculum, other topics, examples, etc. Feedback from students indicates that more resources (videos) are needed for using Excel.

REFERENCES:

Light, R. (2001). *Making the most of college: Students speak their minds*. Cambridge, MA: Harvard University Press.

Moritz-Long, D. (2017). *Everyone Wins with Alison Hammack's Welcoming, Inclusive and Nurturing (WIN) Exam Plan – Faculty Highlight*. Valencia The Grove.

Schwebel, D. S., Walburn, N. C., Klyce, K., & Jerrolds, K. L. (2012). Efficacy of advising outreach on student retention, academic progress and achievement, and frequency of advising contacts: A longitudinal randomized trial. *NACADA Journal*, 32(2), 36-43. doi:10.12930/0271-9517-32.2.36