Chemistry Lecture Success Rates and Concurrent Lab Class Enrollment

Ventura College's Chemistry curriculum is offered to students as separate lecture and laboratory classes. Students can choose to take the lecture and lab classes concurrently or in different semesters. At the request of VP Kalfsbeek-Goetz and Chemistry Department Chair, Malia Rose-Seisa, the IE office conducted analyses to evaluate course success rates in the lecture class when students take the lab class concurrently vs. when they only take the lecture course in a given term.

The analysis only includes students who are enrolled on their first attempt in the specific Chemistry classes below between Fall 2012 and Spring 2022 (n = 5,314).

- CHEM V01A 3 units Lecture Class
- CHEM V01AL 2 units Laboratory Class (Pre-Requisite: CHEM V01A or concurrent enrollment)
- CHEM V01B 3 units Lecture Class
- CHEM V01BL 2 units Laboratory Class (Pre-Requisite: CHEM V01B or concurrent enrollment)

Regression Analysis

Hierarchical linear regression analyses were conducted to evaluate the effect of concurrent lab classes enrollment on course success. Preliminary analyses indicated that student demographics (i.e. gender, ethnicity, and unit load) varied between students who took the lab section concurrently vs. those who did not. Thus, to factor out the effects of these variables, they were entered into the first step of the model. Gender, ethnicity, and unit load were all significant predictors of course success in the lecture course. Then, in the next step, a binary indicator for the presence or absence of the concurrent lab class (i.e. student group) was added to the model. Student group 1 included students who enrolled in the lecture and a laboratory class concurrently. Student group 2 included students who only enrolled in the lecture class. The student group variable was a significant predictor of course success in the lecture class. This means that students who enrolled in the lab class concurrently had significantly higher course success rates in the lecture class, even after accounting for the effects of gender, ethnicity, and unit load.

Predictor variables	Regression 1	Regression 2
Gender (1=female; 0=male)	.078	.133
Unit Load (1=Full-time; 0=part-time)	<.001	<.001
Ethnicity (1=Hispanic, Black, Native Amer, Pac Isld; 0=White, Asian)	<.001	<.001
Group (1=concurrently taking Lecture & Lab; 0=taking only lecture)		<.001
R^2	.031	.059
R^2 change	.031	.028

Independent Sample *t-Tests*

In order to examine additional within-group differences, independent sample *t*-tests were conducted. This analysis included 5,314 enrollments in four Chemistry courses aforementioned across ten years. The majority of these tests were significant; indicating that within most demographic groups, lecture course success rates were higher when students enrolled in the lab class concurrently.

CHEM V01A and CHEM V01B

	Lecture and Lab		Lecture Only	
	N	Course Success Rate	N	Course Success Rate
All Enrollments	4,582	*73.2%	732	*51.2%

*Statistically significant difference

CHEM V01A

	Lecture and Lab		Lecture Only	
	N	Course Success Rate	N	Course Success Rate
Asian Students	266	75.2%	31	67.7%
Hispanic Students	1,824	*66.2%	258	*33.7%
White Students	933	*73.6%	139	*56.1%
Female Students	1,566	*70.1%	223	*45.3%
Male Students	1,632	*68.4%	249	*42.2%
Male Students of Color	935	*66.0%	135	*36.0%
Under 20 years	1,756	*70.6%	228	*38.2%
20-24 years	988	*66.0%	185	*47.0%
25-29 years	304	70.7%	41	61.0%
Over 30 years	205	*69.8%	27	*44.4%
Full-time Students	2,371	*71.9%	273	*48.4%
Part-time Students	882	*61.7%	208	*38.0%
All Enrollments	3,253	*69.1%	481	*43.9%

*Statistically significant difference

CHEM V01B

	Lecture and Lab		Lecture Only	
	N	Course Success Rate	N	Course Success Rate
Asian Students	136	84.6%	23	78.3%
Hispanic Students	720	*79.7%	123	*58.5%
White Students	381	*89.5%	83	*71.1%
Female Students	679	*82.5%	119	*69.7%
Male Students	630	*83.8%	129	*62.0%
Male Students of Color	358	*82.0%	63	*52.0%
Under 20 years	553	*85.0%	80	*66.3%
20-24 years	542	*80.6%	128	*68.0%
25-29 years	146	*85.6%	29	*58.6%
Over 30 years	88	80.7%	14	50.0%
Full-time Students	992	*85.0%	154	*72.1%
Part-time Students	337	*77.2%	97	*54.6%
All Enrollments	1,329	*83.0%	251	*65.3%

*Statistically significant difference

Conclusions

Based on the number of enrollments for the past ten years, the vast majority of students preferred to enroll in both lecture and lab classes within the same semester than enrolling in just lecture class, with an 86% to 14% ratio. Further, the results of the analyses above indicate that students who take the lecture and lab classes concurrently have a higher course success rate in the lecture course than those who don't take the lab class concurrently. This effect is significant even after accounting for gender, ethnicity, and unit load.

- Course Success Rate = % of A, B, C, and P grades out of grades assigned (including W's and EW's).
- N = number of enrollments with grades assigned. A single student may be enrolled in one or more courses.
- * = Statistically significant difference in success rate compared to different groups defined.
- Other Chemistry classes were excluded from this study since they are offered less frequently.
- Students who re-take the class are excluded from the study.
- Full-time students = students who are taking 12 or more units; Part-time students = students who are taking less than 12 units.