

# COURSE VALIDATION STUDY

Target Course: CHEM 101  
Prerequisite: MATH 070

The following is statistical data on the validation of the following course prerequisite:  
Successful completion of MATH 070 as a prerequisite for CHEM 101.

**CHEM\_101\_SUCCESS \* Complete\_Math\_070 Crosstabulation**

Count

		Successfully Complete Math 070		Total
		NO	YES	
CHEM_101_SUCCESS	NO	395	94	489
	YES	1038	265	1303
Total		1433	359	1792

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.276(b)	1	.599		
Continuity Correction(a)	.211	1	.646		
Likelihood Ratio	.278	1	.598		
Fisher's Exact Test				.643	.325
Linear-by-Linear Association	.276	1	.600		
N of Valid Cases	1792				

a Computed only for a 2x2 table

b 0 cells (.0%) have expected count less than 5. The minimum expected count is 97.96.

**Chi-Square Measurement:**

The *Chi-Square* measurement tests the hypothesis (*null hypothesis*) that there is “*no difference*” between the two groups. In order to reject this hypothesis and conclude that there is a statistically significant difference between the two groups Chi-Square must be greater than **3.84**. To ensure the validity of the Chi-Square test there is a minimum frequency threshold for a 2x2 table that should be obeyed. If any of the observed frequencies in the cross-tabulation table are **5 or below** than the validity of the Chi-Square measurement is questionable.

CHI-SQUARE = .276      FAIL TO REJECT NULL HYPOTHESIS

**Fisher’s Exact Measurement:**

The *Fisher’s Exact* measurement can be used as an alternative to the Chi-Square measurement where a large sample is difficult to obtain. In order to reject the null hypothesis and conclude that there is a statistically significant difference between the two groups Fisher’s Exact must have a P-value **less than** the standard **.05**.

FISHER’S EXACT = .643      FAIL TO REJECT NULL HYPOTHESIS

**Ratio:**

The ratio to be measured is the ratio of *right response:wrong response*.

A *right response* would be nonsuccess in the prerequisite course combined with nonsuccess in the target course or success in the prerequisite course combined with success in the target course. A *wrong response* would be nonsuccess in the prerequisite course combined with success in the target course or success in the prerequisite course combined with nonsuccess in the target course. For the *study ratio* to meet the *ratio criteria* it must be greater than or equal to **2:1**.

RATIO:  $395+265:1038+94 = 660:1132$

FAILED CRITERIA

**Percent increase:**

*Percent increase* is measured by subtracting the percent success before adjusting for the prerequisite from the percent success after adjusting for the prerequisite. For the *study percent increase* to meet the *percent increase criteria* there must be a difference greater than or equal to **10%** in the positive direction.

PERCENT INCREASE:

FAILED CRITERIA

$1303/1792 = 73\%$  Before Prerequisite

$265/359 = 74\%$  After Prerequisite

**Summary**

A total sample of 100, with at least 20 students in the non-successful group for the target course is recommended. In this case the total sample is sufficient (1,792), with the number in the non-successful group above the recommended level (489). Both the chi-square test and the Fishers Exact test fail to reject the null hypothesis that success in MATH 070 is independent of success in CHEM 101, showing that there is no statistical evidence that MATH 070 is necessary for success in CHEM 101. MATH 070 also fails both the Ratio and Percent Increase criteria. At this time there is no statistical evidence that MATH 070 is suitable as a prerequisite for CHEM 101.