

**Scenario Problems for EDTC 810 - (Course Project - Not Actual Research)**  
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**Scenario 1**

Online learning math class is being piloted to compare online learning developed by an instructor to a face-to-face setting. Each class was randomly distributed. The total population for both sections was  $N=50$ . Only 20 in each agreed to participate. Pretest and posttest scores, along with satisfaction, engagement, and motivation were measured. Although there was a sample of 20, one student in the online and in the classroom settings had complete data. It cannot be determined if that student's score changed from pretest to posttest or if satisfaction, engagement, or motivation occurred. That student was removed from the data set in each setting.

*RQ#1: Is there a difference between online and classroom instructional delivery?*

The null hypothesis stated that there is no difference between online and classroom instructional delivery. An independent sample  $t$ -test was conducted to compare posttest scores between the two groups, online ( $n=19$ ) and classroom ( $n=19$ ). Regarding scores, there was a significant difference in the scores for online ( $M=87.68$ ,  $SD=8.41$ ) and classroom ( $M=89.37$ ,  $SD=5.49$ ) settings;  $t(36)=-7.31$ ,  $p=4.69$ . These results suggest that the classroom setting had a positive effect posttest scores.

*RQ#2: Is there a difference within groups between the pretest and posttest.*

To test the null hypothesis that there is no difference within groups between the pretest and posttest, a dependent samples  $t$ -test was conducted. The pretest scores were compared to the posttest scores within each of the two groups. Each took a pretest and a posttest exam, which had a maximum possible score of 100.

In the online group ( $n=19$ ), there was a significant difference in the scores for pretest ( $M=59.79$ ,  $SD=8.84$ ) in and posttest ( $M=87.68$ ,  $SD=8.41$ ) conditions;  $t(18)=19.12$ ,  $p=0.00$ . These results suggest that online learning had an effect on posttest scores.

In the classroom group ( $n=19$ ), there was a significant difference in the scores for pretest ( $M=60.11$ ,  $SD=9.18$ ) in and posttest ( $M=89.37$ ,  $SD=5.49$ ) conditions;  $t(18)=11.09$ ,  $p=0.00$ . These results suggest that learning in a classroom setting had an effect on posttest scores.

*RQ#3: Is there a difference between online and classroom instructional delivery based on student responses to satisfaction, engagement, and motivation?*

To test the null hypothesis that there is no difference between online ( $n=19$ ) and classroom ( $n=19$ ) instructional delivery based on student responses to satisfaction, engagement, and motivation, independent  $t$ -tests were done. The survey for each of the categories was out of 10 possible points.

Regarding satisfaction, there was a no significant difference in the scores for online ( $M=8.05$ ,  $SD=1.31$ ) and classroom ( $M=6.16$ ,  $SD=1.01$ ) settings;  $t(36)=4.98$ ,  $p=0.00$ . These results suggest that the classroom setting did not affect on student satisfaction.

The scores for engagement indicate no significant difference in the scores for online ( $M=8.21$ ,  $SD=1.18$ ) and classroom ( $M=6.74$ ,  $SD=1.19$ ) settings;  $t(36)=3.82$ ,  $p=0.01$ . These results suggest that the classroom setting had no affect on engagement.

For motivation, there was no significant difference in the scores for online ( $M=8.68$ ,  $SD=1.16$ ) and classroom ( $M=6.37$ ,  $SD=1.12$ ) settings;  $t(36)=6.29$ ,  $p=0.00$ . These results suggest that the classroom setting had no significant effect on motivation. *RQ#4: Is there any relationship between student growth in classroom and online and satisfaction, engagement, and motivation?*

The relationship between student growth in classroom ( $n=19$ ) and online ( $n=19$ ) settings and satisfaction, engagement, and motivation was tested. Because there were two variables in the two settings, pretest and posttest scores, a  $t$ -test for the significance of the correlation coefficient was conducted. The null hypothesis states that there is no relationship between student growth and satisfaction, engagement, and motivation.

Regarding the online setting, the growth from pretest to posttest was  $M=27.85$ ,  $SD=6.54$  ( $n=19$ ). Online satisfaction ( $M=8.05$ ,  $SD=1.31$ ), engagement ( $M=8.21$ ,  $SD=1.18$ ), and motivation ( $M=8.68$ ,  $SD=1.16$ ) each had a maximum score of 10. There was a moderate to weak relationship between growth and engagement, a weak relationship between motivation and engagement, and a strong relationship between satisfaction and engagement. The other data sets had a weak or no relationship.

Table 1.1

*Correlations of student growth, satisfaction, engagement, and motivation for online setting.*

		<b>Correlations Online</b>			
		Growth			
		Difference	Satisfaction	Engagement	Motivation
Growth	Pearson	1	-.284	-.464*	.179
Difference	Correlation				
	Sig. (2-tailed)		.238	.045	.464
	N	19	19	19	19

Satisfaction	Pearson	-.284	1	.602**	.048
	Correlation				
	Sig. (2-tailed)	.238		.006	.845
	N	19	19	19	19
Engagement	Pearson	-.464*	.602**	1	.336
	Correlation				
	Sig. (2-tailed)	.045	.006		.160
	N	19	19	19	19
Motivation	Pearson	.179	.048	.336	1
	Correlation				
	Sig. (2-tailed)	.464	.845	.160	
	N	19	19	19	19

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

Regarding the classroom setting, the growth from pretest to posttest was  $M=29.79$ ,  $SD=11.28$  ( $n=19$ ). Classroom satisfaction ( $M=6.16$ ,  $SD=1.01$ ), engagement ( $M=6.74$ ,  $SD=1.19$ ), and motivation ( $M=6.37$ ,  $SD=1.12$ ) each had a maximum score of 10. There was a strong relationship between growth and satisfaction. There was a moderate relationship between satisfaction, engagement, and motivation.

Table 1.2

*Correlations of student growth, satisfaction, engagement, and motivation for classroom setting.*

		<b>Correlations Classroom</b>			
		Growth			
		Difference	Satisfaction	Engagement	Motivation
Growth Difference	Pearson	1	.056	-.132	.165
	Correlation				
	Sig. (2-tailed)		.818	.590	.499
	N	19	19	19	19
Satisfaction	Pearson	.056	1	.495*	.535*
	Correlation				
	Sig. (2-tailed)	.818		.031	.018

	N	19	19	19	19
Engagement	Pearson	-.132	.495*	1	.118
	Correlation				
	Sig. (2-tailed)	.590	.031		.629
	N	19	19	19	19
Motivation	Pearson	.165	.535*	.118	1
	Correlation				
	Sig. (2-tailed)	.499	.018	.629	
	N	19	19	19	19

\*. Correlation is significant at the 0.05 level (2-tailed).

Classroom posttest scores were also on a 100 point scale,  $M=89.37$ ,  $SD=5.49$ . Satisfaction ( $M=6.16$ ,  $SD=1.01$ ), engagement ( $M=6.74$ ,  $SD=1.19$ ), and motivation ( $M=6.37$ ,  $SD=1.12$ ) each had a maximum score of 10.

*RQ#5: Is there any relationship between student posttest scores in classroom and online and satisfaction, engagement, and motivation?*

To determine the relationship between student posttest scores in classroom ( $n=19$ ) and online ( $n=19$ ) and satisfaction, engagement, and motivation, a correlation was tested. Regarding online posttest scores, on a 100 point scale,  $M=87.68$ ,  $SD=8.41$ . Online satisfaction ( $M=8.05$ ,  $SD=1.31$ ), engagement ( $M=8.21$ ,  $SD=1.18$ ), and motivation ( $M=8.68$ ,  $SD=1.16$ ) each had a maximum score of 10. Table 1.3 illustrates the correlation of online settings. Engagement had a strong relationship with satisfaction. There was a weak or no relationship between the other sets of data.

Table 1.3

*Correlations of posttest, satisfaction, engagement, and motivation for online setting.*

### Correlations Online

		Posttest	Satisfaction	Engagement	Motivation
Posttest	Pearson	1	-.276	-.267	.075
	Correlation				
	Sig. (2-tailed)		.253	.269	.761
	N	19	19	19	19
Satisfaction	Pearson	-.276	1	.602**	.048
	Correlation				
	Sig. (2-tailed)	.253		.006	.845
	N	19	19	19	19
Engagement	Pearson	-.267	.602**	1	.336
	Correlation				
	Sig. (2-tailed)	.269	.006		.160
	N	19	19	19	19
Motivation	Pearson	.075	.048	.336	1
	Correlation				
	Sig. (2-tailed)	.761	.845	.160	
	N	19	19	19	19

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Classroom posttest scores were also on a 100 point scale,  $M=89.37$ ,  $SD=5.49$ . Satisfaction ( $M=6.16$ ,  $SD=1.01$ ), engagement ( $M=6.74$ ,  $SD=1.19$ ), and motivation ( $M=6.37$ ,  $SD=1.12$ ) each had a maximum score of 10. Table 1.4 pertains to classroom teaching. In the classroom, there was a strong relationship between satisfaction and posttest scores. The posttest scores had a weak to no relationship with the other data sets. There was a moderate relationship between satisfaction, engagement, and motivation.

Table 1.4

*Correlations of posttest, satisfaction, engagement, and motivation for classroom setting.*

<b>Correlations Classroom</b>					
		Posttest	Satisfaction	Engagement	Motivation
Posttest	Pearson	1	.109	.270	.167
	Correlation				

	Sig. (2-tailed)		.658	.264	.494
	N	19	19	19	19
Satisfaction	Pearson Correlation	.109	1	.495*	.535*
	Sig. (2-tailed)	.658		.031	.018
	N	19	19	19	19
Engagement	Pearson Correlation	.270	.495*	1	.118
	Sig. (2-tailed)	.264	.031		.629
	N	19	19	19	19
Motivation	Pearson Correlation	.167	.535*	.118	1
	Sig. (2-tailed)	.494	.018	.629	
	N	19	19	19	19

\*. Correlation is significant at the 0.05 level (2-tailed).

## Scenario 2

The nursing certification course passes students who achieve at least an 80 or higher on a standardized test. This study will analyze asynchronous or synchronous delivery and its affect on students passing, as well as gauged by the national and institutional score levels. Further, students were assessed participation and satisfaction levels, ranging from 0 to 10 (10 is the highest score).

*RQ#1: Is there difference between delivery methods?*

The null hypothesis stated that there is no difference between delivery methods. An independent sample *t*-test was conducted to compare scores between the two groups, synchronous ( $n=15$ ) and asynchronous ( $n=15$ ), as well as participation and satisfaction. Regarding scores, there was a significant difference in the scores for synchronous ( $M=80.87$ ,  $SD=7.43$ ) and asynchronous ( $M=87.40$ ,  $SD=7.61$ ) settings;  $t(28)=-2.38$ ,  $p=0.02$ . For participation, there was a significant difference in the scores for synchronous ( $M=6.60$ ,  $SD=1.72$ ) and asynchronous ( $M=7.73$ ,  $SD=2.02$ ) settings;  $t(28)=-1.66$ ,  $p=0.11$ . When satisfaction was tested, there was a significant difference in the scores for synchronous ( $M=6.67$ ,  $SD=1.35$ ) and asynchronous ( $M=7.60$ ,  $SD=2.26$ ) settings;  $t(28)=-1.37$ ,  $p=0.18$ .

*RQ#2: How do students in both classes compare to national and institution averages?*

The synchronous ( $n=15$ ) and asynchronous ( $n=19$ ) scores were compared to the national and institutional averages. The synchronous average ( $M=80.87$ ,  $SD=7.43$ ) was lower than the national average (87), as well as the institutional score (84). The asynchronous average ( $M=87.40$ ,  $SD=7.61$ ) was higher than the institutional score (84) and was slightly higher in value than the national average (87).

*RQ#3: Is there a difference based on delivery method for achievement.*

The null hypothesis stated that there is no difference between delivery methods for achievement. An independent sample *t*-test was conducted to compare scores between the two groups, synchronous ( $n=15$ ) and asynchronous ( $n=15$ ). Regarding scores, there was a significant difference in the scores for synchronous ( $M=80.87$ ,  $SD=7.43$ ) and asynchronous ( $M=87.40$ ,  $SD=7.61$ ) settings;  $t(28)=-2.38$ ,  $p=0.02$ .

*RQ#4: Is there a there a correlation between delivery method and participation or satisfaction?*

To determine the relationship between delivery method, participation or satisfaction, a correlation was tested. Regarding online participation, on a 10-point scale,  $M=7.17$ ,  $SD=1.93$ . For satisfaction,  $M=7.13$ ,  $SD=1.19$ , also with a maximum score of 10. Table 2.1 illustrates the correlation. There was a weak relationship between delivery, participation or satisfaction.

Table 2.1

*Correlations of delivery, participation and satisfaction.*

		Delivery	Participation	Satisfaction
Delivery	Pearson Correlation	1	.298	.251
	Sig. (2-tailed)		.109	.180
	N	30	30	30
Participation	Pearson Correlation	.298	1	.353
	Sig. (2-tailed)	.109		.056
	N	30	30	30
Satisfaction	Pearson Correlation	.251	.353	1

Sig. (2-tailed)	.180	.056	
N	30	30	30

*RQ#5: Is there a difference based on gender for any of the measures?*

The null hypothesis stated that there is no difference between any of the measures and gender. An independent sample *t*-test was conducted to compare score, participation, and satisfaction to gender, males ( $n=13$ ) and females ( $n=17$ ). Regarding scores, there was a significant difference in the scores for males ( $M=85.31$ ,  $SD=8.06$ ) and females ( $M=83.24$ ,  $SD=8.27$ );  $t(28)=0.69$ ,  $p=0.50$ . Regarding participation, there was a significant difference in the scores for males ( $M=7.23$ ,  $SD=2.20$ ) and females ( $M=7.12$ ,  $SD=1.76$ );  $t(28)=0.16$ ,  $p=0.88$ . Regarding satisfaction, there was a significant difference in the scores for males ( $M=6.31$ ,  $SD=1.32$ ) and females ( $M=7.76$ ,  $SD=2.05$ );  $t(28)=-2.23$ ,  $p=0.03$ .