

Paramedic Program Assessment
August 8, 2023
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Situation:

There has been a steady increase in the number of attempts paramedic students are making before passing, failing, or giving up on future attempts.

Background:

Around 2008 the part-time program was discontinued because the program took nearly two years to complete, the completion and pass rates were low compared to the full-time program, and enrollment was generally low. Class met Monday and Wednesday evenings throughout the semester.

In 2010 the Paramedic for the Experienced EMT (PEEMT) Program was developed. The goal was to revive Monday and Wednesday evening classes and allow students to finish in one year. In addition to the two classes a week, much of the curriculum was offered online asynchronously. Only EMTs with five years of experience were allowed into the program. This enabled the removal of a large amount of EMT review content as it was speculated the experienced EMTs would be more competent. PEEMT was discontinued after one run because of low enrollment, an inability to get enough students for a second running, and a poor retention and pass rate.

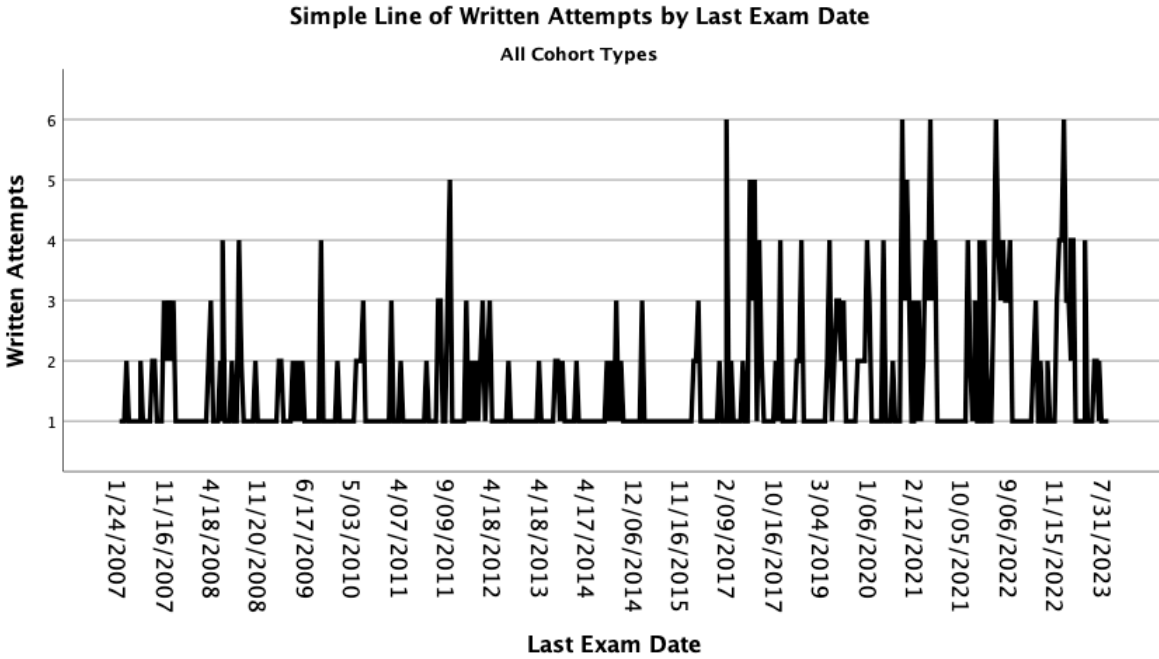
In 2014 the National Highway Transportation Administration (NHTSA) updated the paramedic curriculum. The full-time program curriculum was updated, and faculty created the Paramedic Science AAS, which used EMSP designator courses.

In 2020 In 2014 the National Highway Transportation Administration (NHTSA) once again updated the paramedic curriculum. The program continued to use the EMSP designator courses without an update.

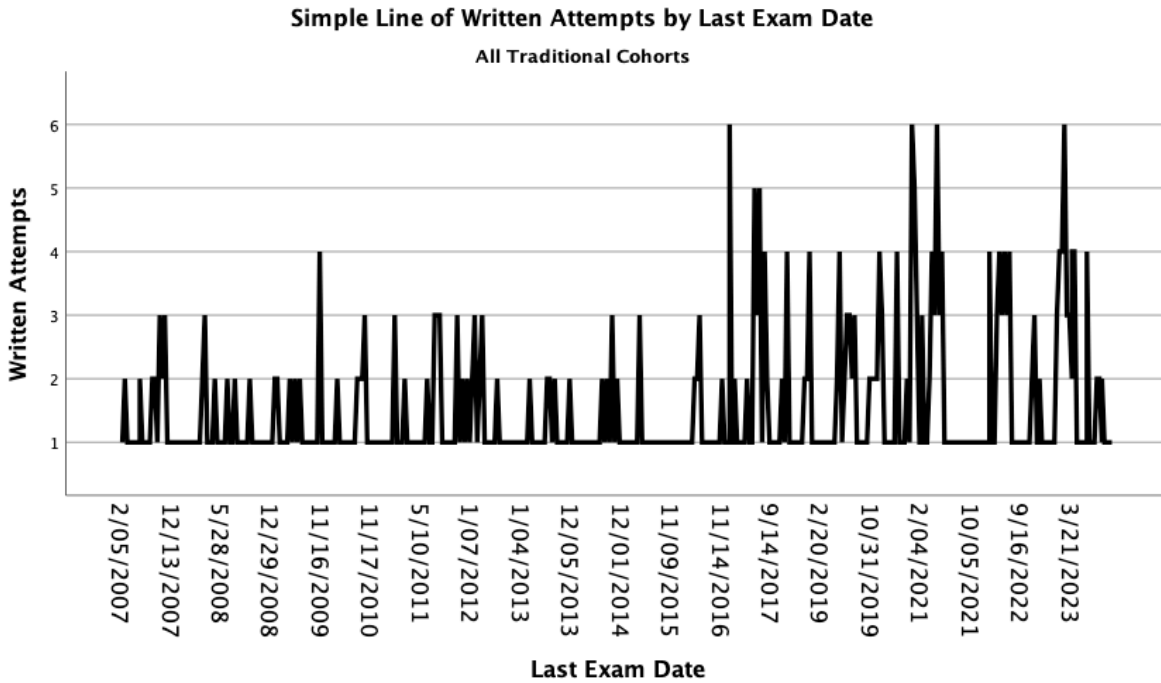
In 2019 the Paramedic Fire Program was launched. The PEEMT curriculum was repackaged into the Paramedic Fire Science AAS. Content was delivered asynchronously online and in three consecutive days of eight-hour class time each month. This enabled completion of the program in roughly one year.

In 2022 the traditional Paramedic Science diploma and AAS was created. The 2014 EMSP designator courses were dropped in favor of the 2010 EMSE curriculum.

All paramedic cohorts—traditional and Paramedic Fire—are utilizing 2010 EMSE courses. The PF program takes one year to complete and the traditional takes 10 months. The traditional



This graph includes all cohorts who were eligible for the cognitive exam.



This graph excludes traditional students who tested in fall 2023 but have either failed or not attempted the exam yet. Fall 2023 students who passed the exam are included.

T-Test

Group Statistics					
Trad < or > Summer 2019		N	Mean	Std. Deviation	Std. Error Mean
Written Attempts	<sum2019	394	1.33	.766	.039
	>sum2019	118	1.64	1.195	.110

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
										Lower	Upper
Written Attempts	Equal variances assumed	43.538	<.001	-3.417	510	<.001	<.001	-.317	.093	-.499	-.135
	Equal variances not assumed			-2.716	146.933	.004	.007	-.317	.117	-.547	-.086

Independent Samples Effect Sizes					
		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
Written Attempts	Cohen's d	.883	-.359	-.565	-.152
	Hedges' correction	.884	-.358	-.564	-.151
	Glass's delta	1.195	-.265	-.473	-.056

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

This result has a *p*-value of 0.001, indicating a significant difference between traditional student's testing before summer 2019 and those who tested after summer 2019. The prior to summer 2019 students performed better attempt-wise. Cohen's *d* and Hedge's correction are 0.883 and 0.884, which indicate this is a large effect size.

In summer 2019 the program went without a program director, with a new one beginning in fall.

T-Test

Group Statistics					
Trad < or > 2021		N	Mean	Std. Deviation	Std. Error Mean
Written Attempts	<sum2021	409	1.37	.836	.041
	>sum2021	102	1.54	1.087	.108

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
										Lower	Upper
Written Attempts	Equal variances assumed	13.184	<.001	-1.748	509	.040	.081	-.172	.099	-.366	.021
	Equal variances not assumed			-1.496	132.263	.069	.137	-.172	.115	-.401	.056

Independent Samples Effect Sizes					
		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
Written Attempts	Cohen's d	.891	-.194	-.411	.024
	Hedges' correction	.893	-.193	-.410	.024
	Glass's delta	1.087	-.159	-.376	.060

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

This result has a *p*-value of 0.001, indicating a significant difference between traditional student's testing before summer 2021 and those who tested after summer 2021. The prior to

summer 2021 students performed better attempt-wise. Cohen's *d* and Hedge's correction are 0.891 and 0.893, which indicate this is a large effect size.

Summer 2021 was the first semester after a long-tenured full-time instructor retired.

T-Test

Group Statistics					
	Trad < or > Summer 2022	N	Mean	Std. Deviation	Std. Error Mean
Written Attempts	<sum2022	485	1.41	.904	.041
	>sum2022	27	1.22	.641	.123

Independent Samples Test											
Levene's Test for Equality of Variances			t-test for Equality of Means								
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
										Lower	Upper
Written Attempts	Equal variances assumed	4.192	.041	1.078	510	.141	.282	.190	.176	-.157	.537
	Equal variances not assumed			1.464	32.065	.077	.153	.190	.130	-.074	.455

Independent Samples Effect Sizes					
		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
Written Attempts	Cohen's <i>d</i>	.892	.213	-.175	.601
	Hedges' correction	.894	.213	-.175	.600
	Glass's delta	.641	.297	-.102	.690

a. The denominator used in estimating the effect sizes.
 Cohen's *d* uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

This result has a *p*-value of 0.041, indicating a significant difference between traditional student's testing before summer 2019 and those who tested after summer 2019. The prior to summer 2022 students performed better attempt-wise. Cohen's *d* and Hedge's correction are 0.882 and 0.894, which indicate this is a large effect size.

Fall 2022 was when the traditional program was transitioned from the updated EMSP curriculum to the older EMSE curriculum in favor of reducing program length.

T-Test

Group Statistics

Trad vs Non-Trad		N	Mean	Std. Deviation	Std. Error Mean
Written Attempts	Trad	512	1.40	.892	.039
	NT	34	2.00	1.348	.231

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				95% Confidence Interval of the Difference			
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Written Attempts	Equal variances assumed	14.332	<.001	-3.654	544	<.001	<.001	-.600	.164	-.922	-.277
	Equal variances not assumed			-2.556	34.946	.008	.015	-.600	.235	-1.076	-.123

Independent Samples Effect Sizes

		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
Written Attempts	Cohen's d	.926	-.647	-.996	-.298
	Hedges' correction	.928	-.646	-.995	-.297
	Glass's delta	1.348	-.445	-.805	-.078

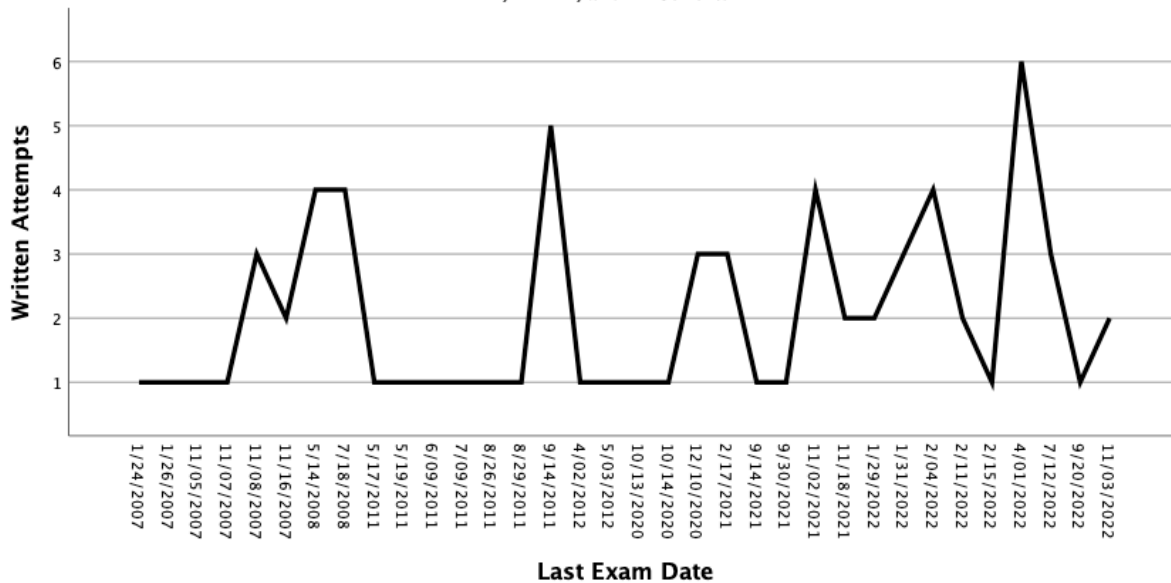
a. The denominator used in estimating the effect sizes. Cohen's d uses the pooled standard deviation. Hedges' correction uses the pooled standard deviation, plus a correction factor. Glass's delta uses the sample standard deviation of the control group.

This result has a *p*-value of 0.001, indicating a significant difference between traditional students and non-traditional students (PT, PEEMT, PF). Traditional students performed better attempt-wise. Cohen's *d* and Hedge's correction are 0.926 and 0.928, which indicate this is a large effect size.

The part-time format and the two using the EMSE format (PEEMT and PF) are inferior to the traditional format.

Simple Line of Written Attempts by Last Exam Date

All PT, PEEMT, and PF Cohorts



T-Test

Group Statistics					
	Non-Paramedic Fire vs PF	N	Mean	Std. Deviation	Std. Error Mean
Written Attempts	NPF	531	1.41	.910	.039
	PF	18	2.33	1.372	.323

Independent Samples Test											
Levene's Test for Equality of Variances					t-test for Equality of Means						
Written Attempts		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
Written Attempts	Equal variances assumed	7.764	.006	-4.152	547	<.001	<.001	-.923	.222	-1.359	-.486
	Equal variances not assumed			-2.833	17.510	.006	.011	-.923	.326	-1.609	-.237

Independent Samples Effect Sizes				
Written Attempts	Standardizer ^a	Point Estimate	95% Confidence Interval	
			Lower	Upper
	Cohen's d	.927	-.995	-1.468
	Hedges' correction	.929	-.994	-1.466
	Glass's delta	1.372	-.673	-1.185

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

This result has a *p*-value of 0.006, indicating a significant difference between students in the Paramedic Fire Program and those who were not in that program. The prior to summer 2022 students performed better attempt-wise. Cohen's *d* and Hedge's correction are 0.927 and 0.929, which indicate this is a large effect size.

T-Test

Group Statistics					
	PF or > Summer 2022 Trad	N	Mean	Std. Deviation	Std. Error Mean
Written Attempts	PF	18	2.33	1.372	.323
	>sum2022	21	1.00	.000	.000

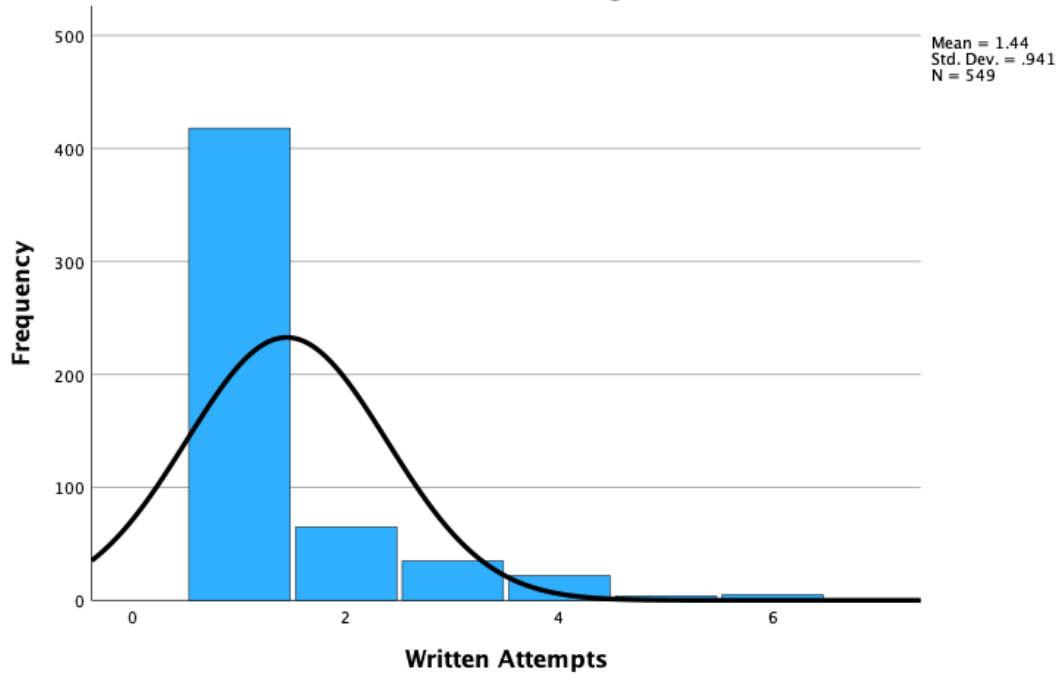
Independent Samples Test											
Levene's Test for Equality of Variances					t-test for Equality of Means						
Written Attempts		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
Written Attempts	Equal variances assumed	36.825	<.001	4.464	37	<.001	<.001	1.333	.299	.728	1.939
	Equal variances not assumed			4.123	17.000	<.001	<.001	1.333	.323	.651	2.016

Independent Samples Effect Sizes				
Written Attempts	Standardizer ^a	Point Estimate	95% Confidence Interval	
			Lower	Upper
	Cohen's d	.930	1.434	.717
	Hedges' correction	.949	1.404	.703
	Glass's delta	.	.	.

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

This result has a *p*-value of 0.001, indicating a significant difference between traditional students and those in the Paramedic Fire (PF) Program. Traditional students with the EMSE designator course performed better attempt-wise. Cohen's *d* and Hedge's correction are 0.930 and 0.949, which indicate this is a large effect size.

Histogram



Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Written Attempts	549	74.6%	187	25.4%	736	100.0%

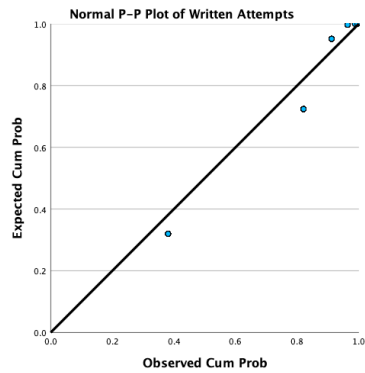
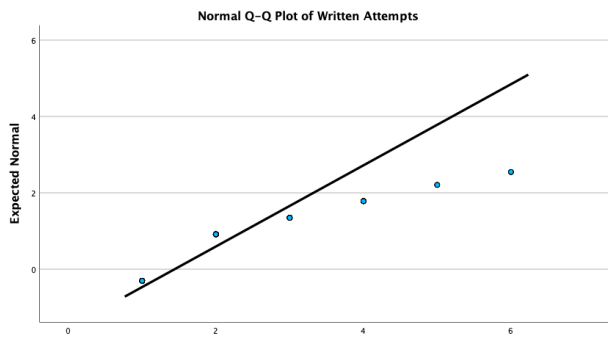
Descriptives

		Statistic	Std. Error	
Written Attempts	Mean	1.44	.040	
	95% Confidence Interval for Mean	Lower Bound	1.36	
		Upper Bound	1.52	
	5% Trimmed Mean	1.29		
	Median	1.00		
	Variance	.886		
	Std. Deviation	.941		
	Minimum	1		
	Maximum	6		
	Range	5		
	Interquartile Range	0		
	Skewness	2.486	.104	
	Kurtosis	6.333	.208	

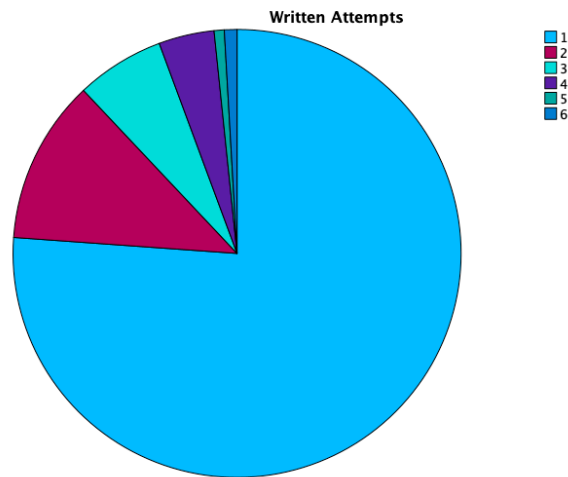
Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Written Attempts	.442	549	<.001	.537	549	<.001

a. Lilliefors Significance Correction



Statistics		
Written Attempts		
N	Valid	549
	Missing	187
Mean		1.44
Std. Error of Mean		.040
Median		1.00
Mode		1
Std. Deviation		.941
Variance		.886
Skewness		2.486
Std. Error of Skewness		.104
Kurtosis		6.333
Std. Error of Kurtosis		.208
Range		5
Minimum		1
Maximum		6
Sum		791



Written Attempts					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	418	56.8	76.1	76.1
	2	65	8.8	11.8	88.0
	3	35	4.8	6.4	94.4
	4	22	3.0	4.0	98.4
	5	4	.5	.7	99.1
	6	5	.7	.9	100.0
	Total		549	74.6	100.0
Missing	System	187	25.4		
Total		736	100.0		

It is speculated that a variety of factors has led to the increase in NR exam fails. These factors likely include the following.

- A rocky period of program director (PD) transition, which included no PD for an entire summer semester in 2019.
- No updated 2020 NHTSA curriculum changes were brought to the curriculum committee.
- Replacing outdated 2014 curriculum with even more outdated 2010 curriculum.
- Replicating the ingredients of the failed PT and PEEMT programs for use in PF and traditional offerings.
- Removal of a significant number of prerequisites that were in place for decades to ensure students had the experience and education necessary for success.
- The retirement of a long-tenured UFT faculty member with subsequent delays in replacing the position.
- Significant expansion of program offerings (PF, community paramedic) that thinned the available instructor pool.
- Utilization of a newer cadre of adjunct faculty and a UFT with significantly less teaching experience.

- Lack of consistency in course instruction between the cohorts. This is due to staffing shortages and increased demand for courses.

Recommendations:

- Suspend two cohort fall start practices and re-evaluate in the future.
- Work with the Advisory Committee to reinitiate some of the prerequisites that have been removed.
- Re-establish the EMSP designator and update the curriculum to 2020 standards as soon as possible.
- Re-evaluate and re-design to PF curriculum, perhaps using the updated EMSP content. Consider synchronous online class date to supplement the asynchronous and in-person coursework. Consider this being a more hybrid version of the traditional program.
- Re-establish consistency in instruction. i.e., same instructor teaches the same course for multiple cohorts.