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Student Learning and Retention Using a Flight Training Device: A Case Study

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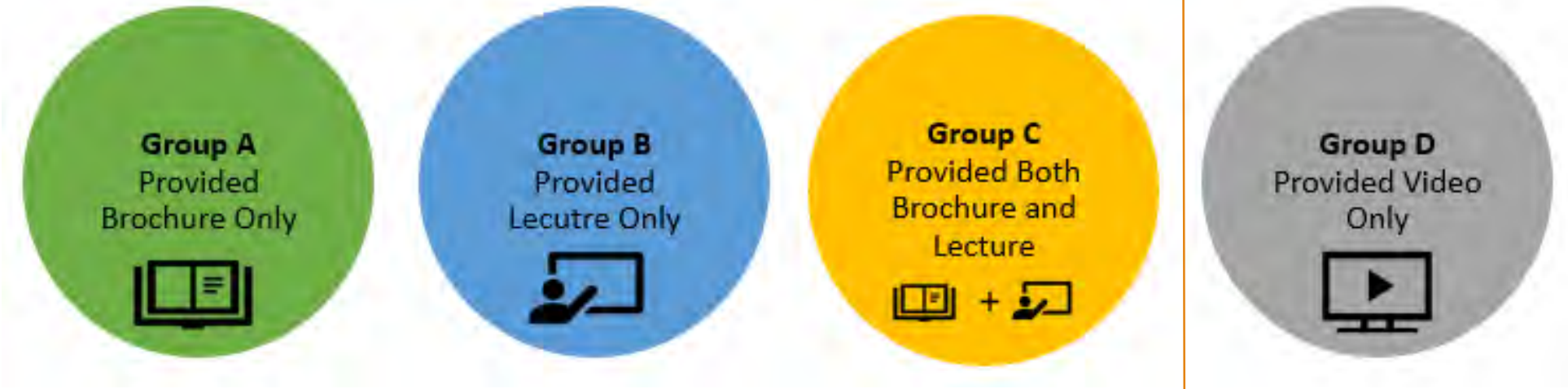
ADEEL KHALID, PH.D.

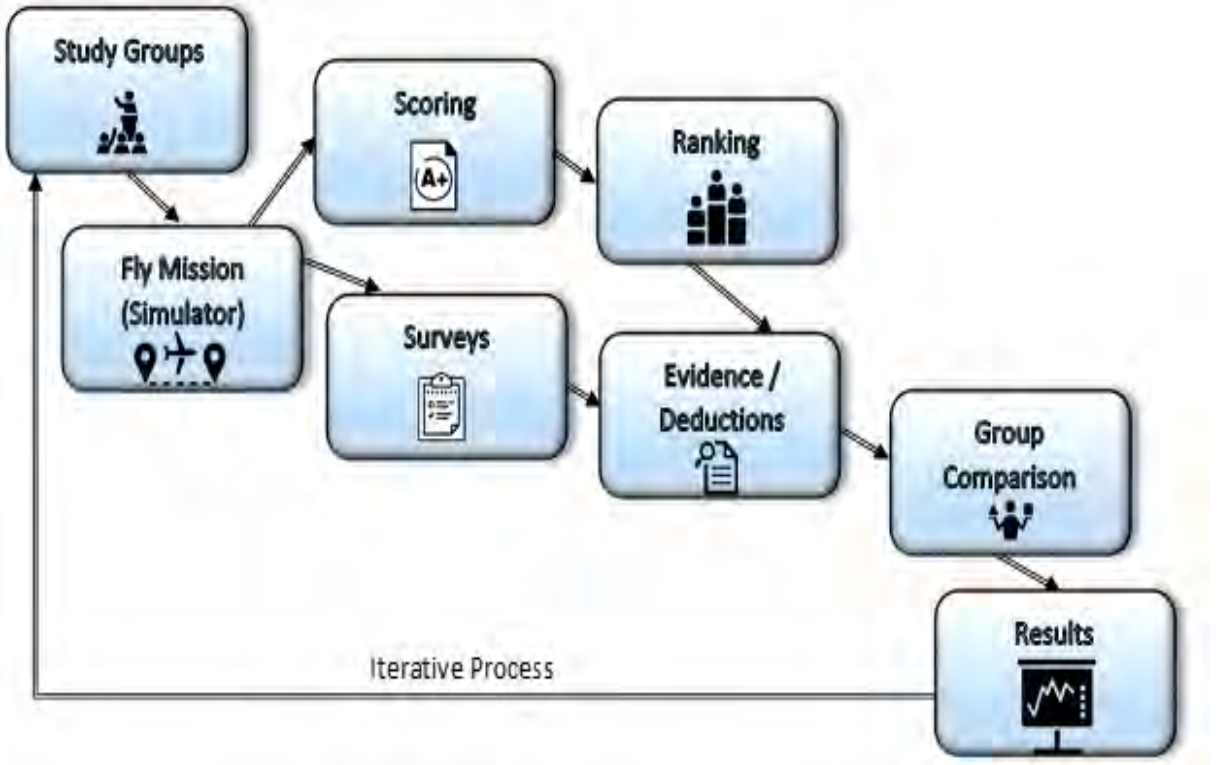
Problem Definition

How do students learn and retain information?

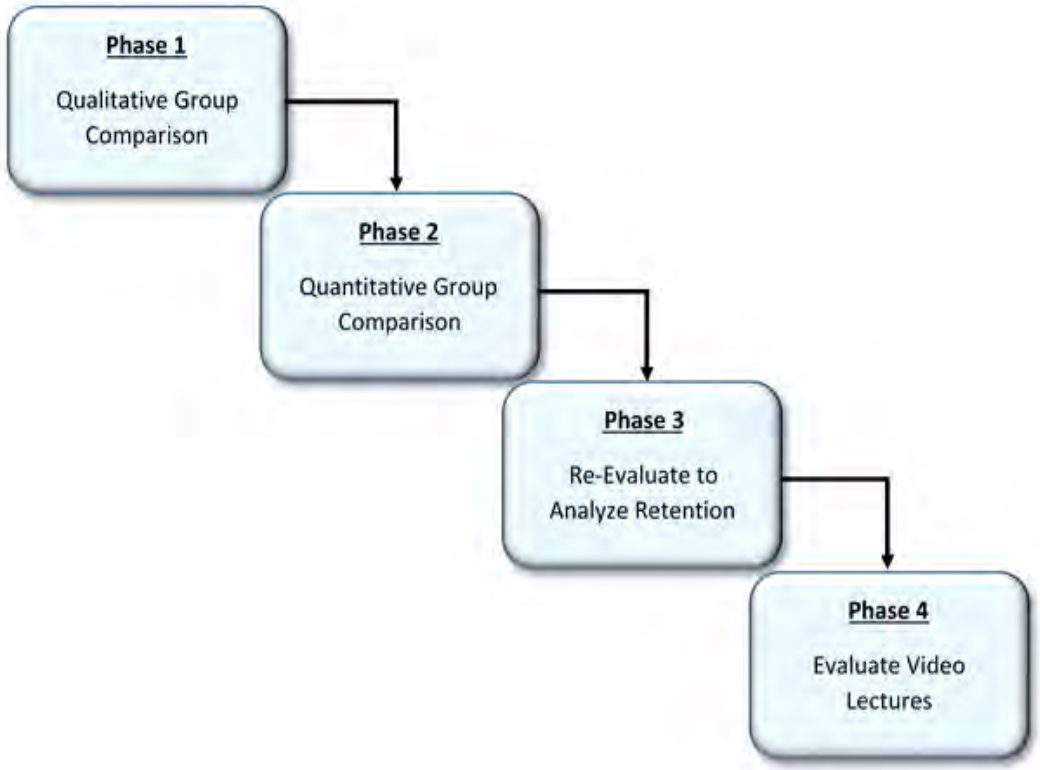
Group Distribution



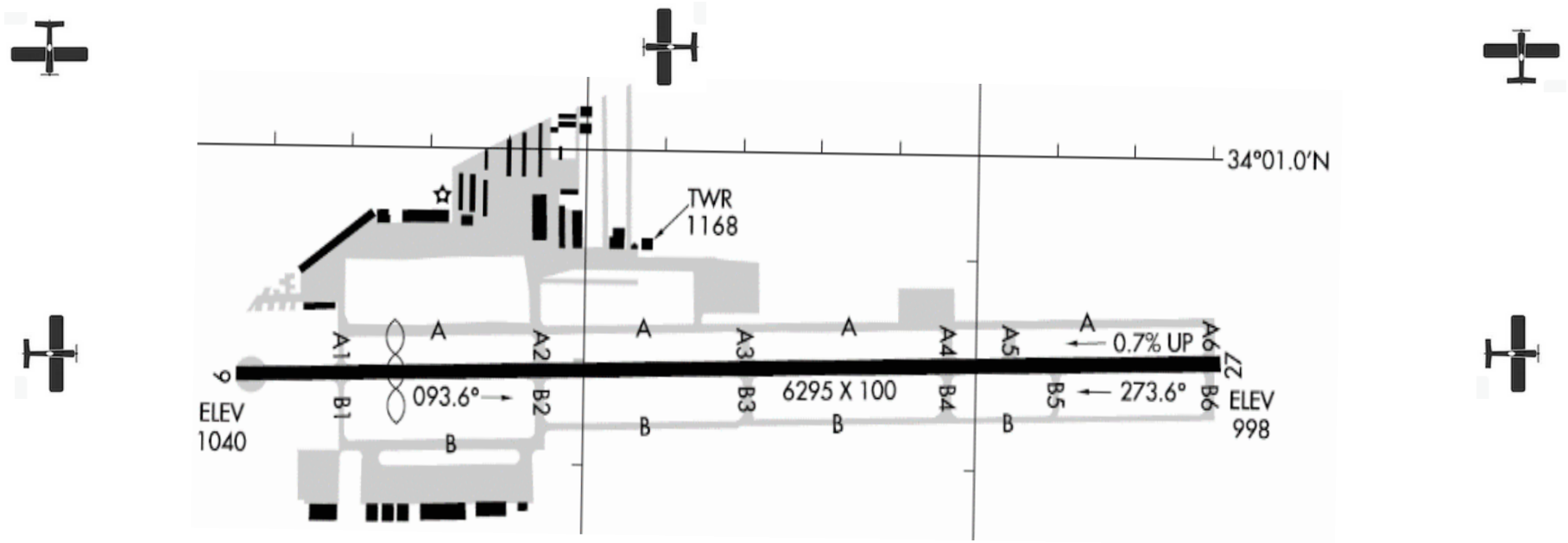
Research Methodology



Phases of Research Study



Standard Traffic Pattern



Evaluation Rubric - Quantitative

No.	Task	Maximum Points	Points Earned
1	Advance the throttle smoothly and start roll out	5	
2	Stay center lined (on runway) using rudder pedals during takeoff	5	
3	Fly upwind at runway heading	5	
4	Keep wings leveled	5	
5	Climb up to 500ft AGL	5	
6	Turn 90 degree left crosswind while climbing	5	
7	Fly for approximately 15 second while holding heading	5	
8	Turn 90 degree left downwind – maintain heading	5	
9	Climb up to and maintain 1000ft AGL (+/- 100ft)	5	
10	Fly for approximately 1 minute	5	
11	Reduce throttle and decrease airspeed (75-85kts)	5	
12	Deploy first set of flaps	5	
13	Start descent	5	
14	Turn 90 degree left base	5	
15	Deploy second set of flaps	5	
16	Turn 90 degree left final	5	
17	Deploy third set of flaps	5	
18	Descend while maintaining airspeed (65-75kts)	5	
19	Land on the runway	5	
20	Apply brakes and come to a full stop - stay on the runway centerline	5	
	Total	100	

Post Flight Questions - Qualitative

No.	Question	Score
1	Flying the aircraft simulator and completing the mission was a simple task	
2	I feel that given the information, I was able to complete the mission really well	
3	Taking part in the flight training simulation piqued my interest in aerospace	
4	I found this to be a challenging and exciting experience	
5	I want to fly this mission again to improve my skills	
	Total	

Qualitative Results

"…very enjoyable experience. Would definitely be extremely overwhelming for an absolute beginner"

Qualitative Results

“The info given was straightforward, and should’ve been easy to follow, but for someone such as myself, who has never flown a plane nor participated in a simulation, it was difficult to pull off successfully. However, it was very interesting, and I would like to try and sharpen my skills through my college career”

Qualitative Results

“Real fun. Learned more about aircraft controls than I ever would have learned”

Qualitative Results

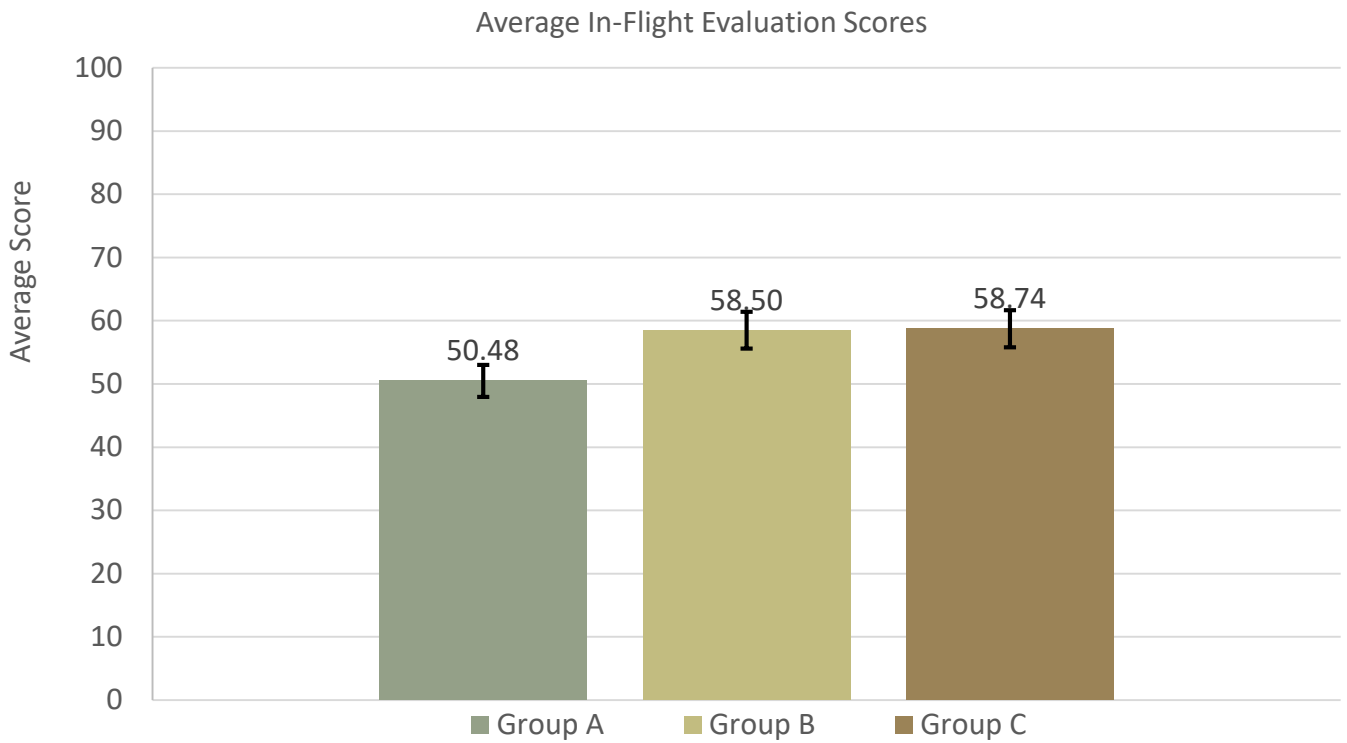
“This was my first time flying and it was the most exciting thing I have experienced this semester and it was difficult but very fun at the same time”

Qualitative Results

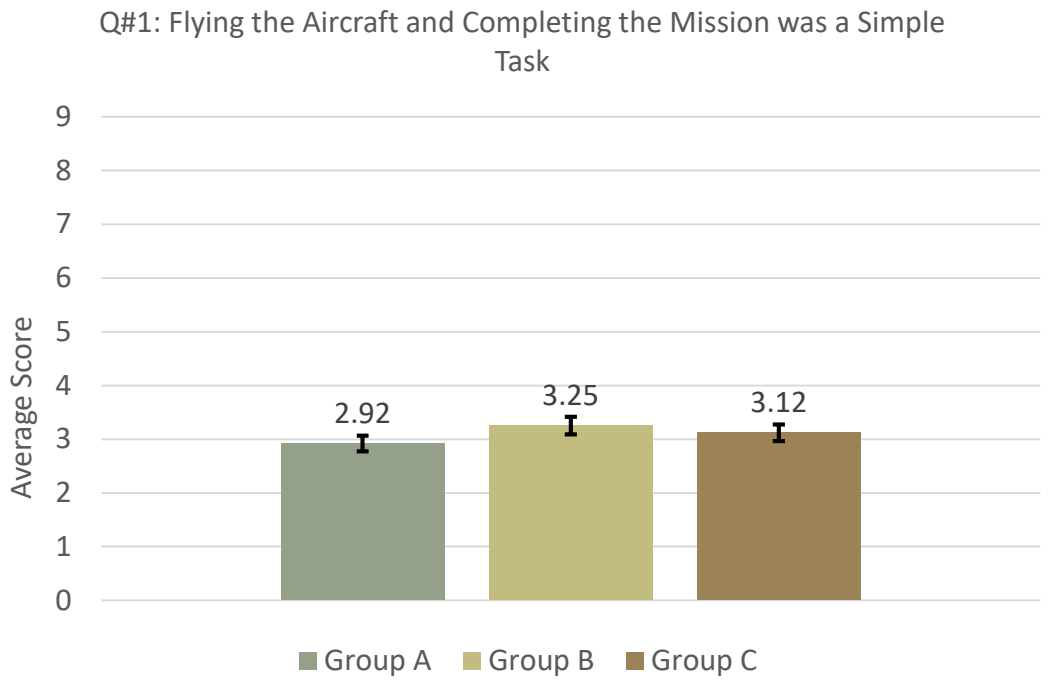
"The instructor explained all of the steps well, however once I was in flight, I started panicking and I struggled a few times to start. Once I started, I used what I had just learned to complete at least 50% of the steps"

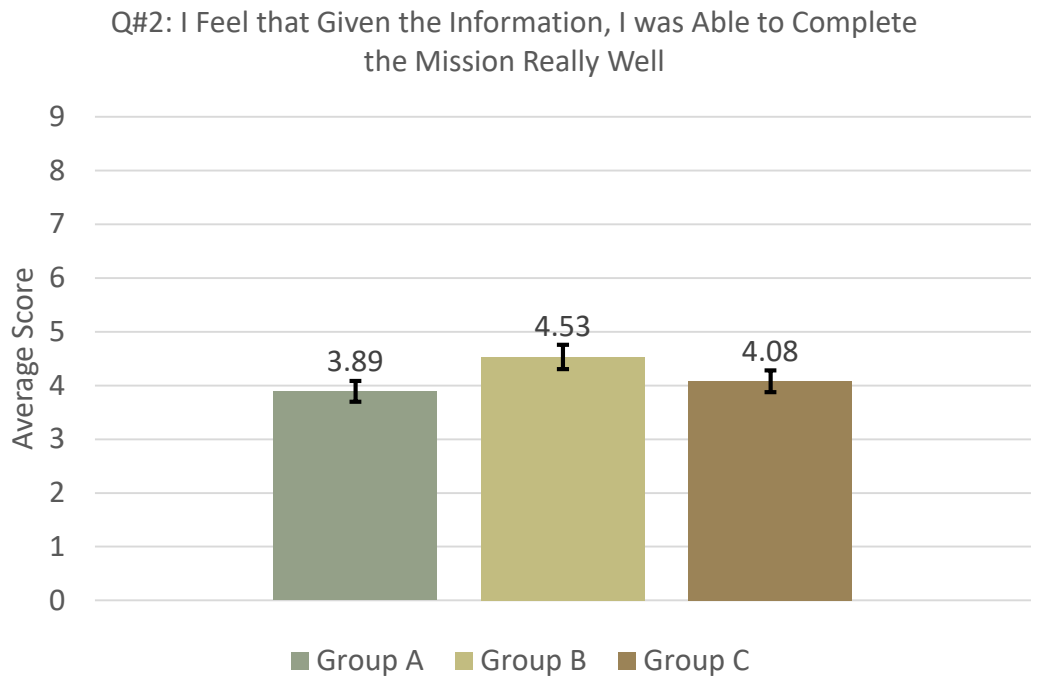
"My heart was racing"

Quantitative Results – Average Flight Scores

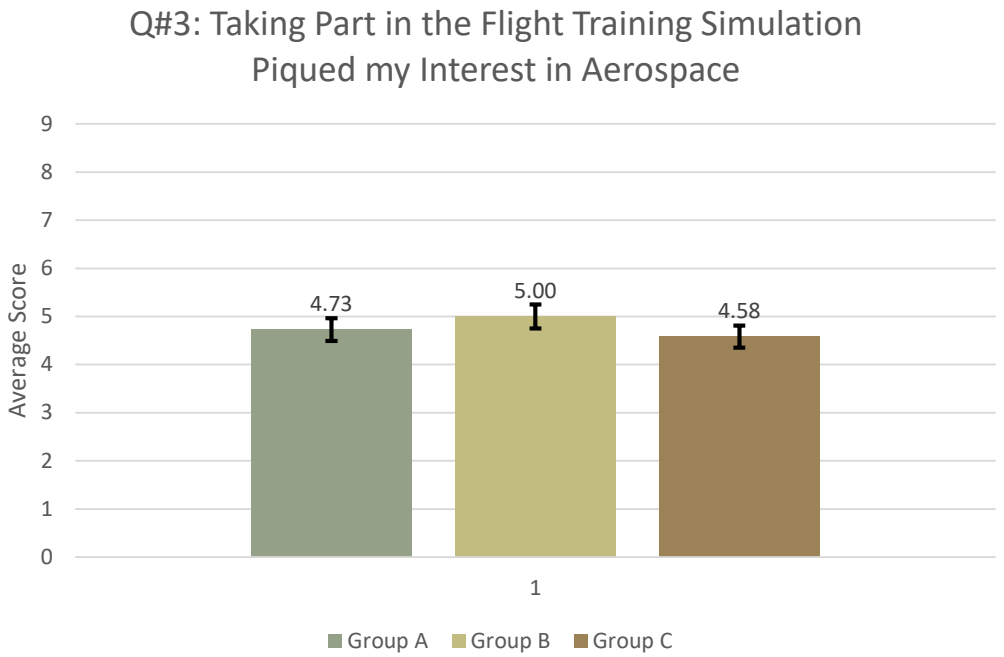


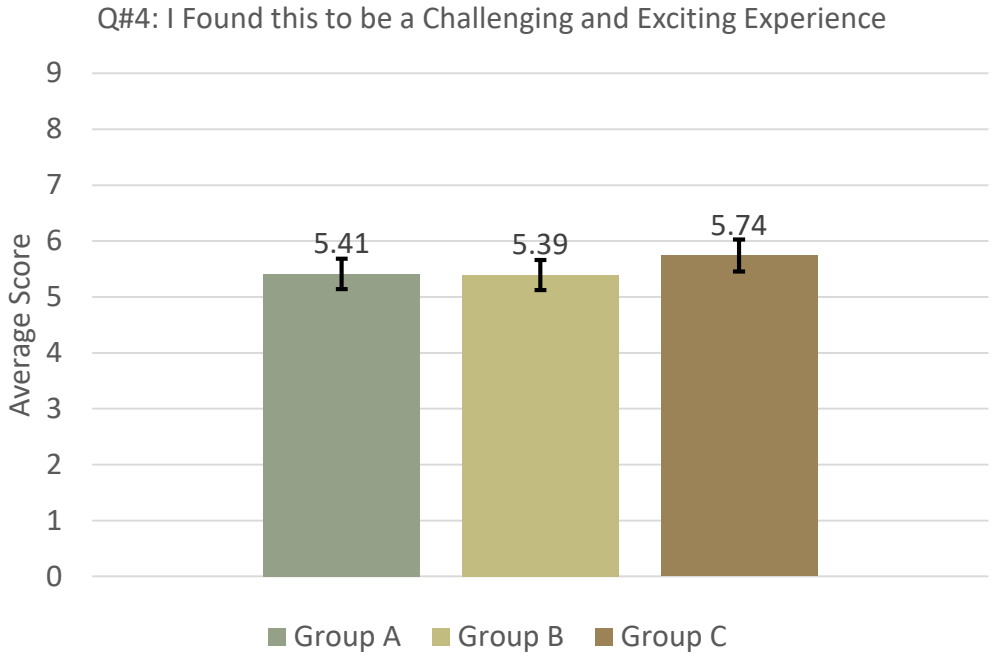
Quantitative Results – Survey Results



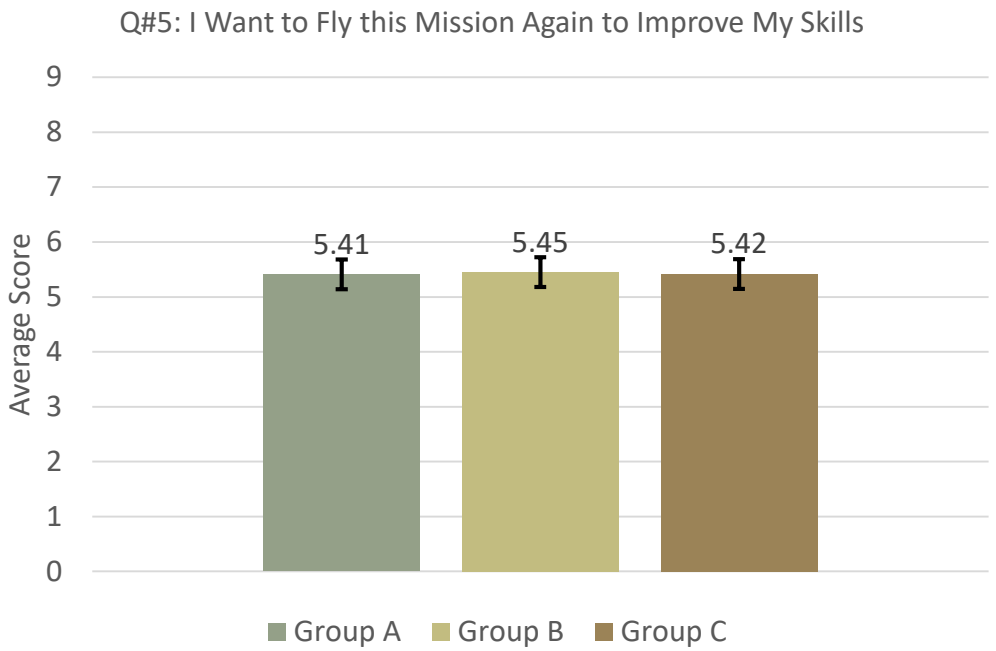


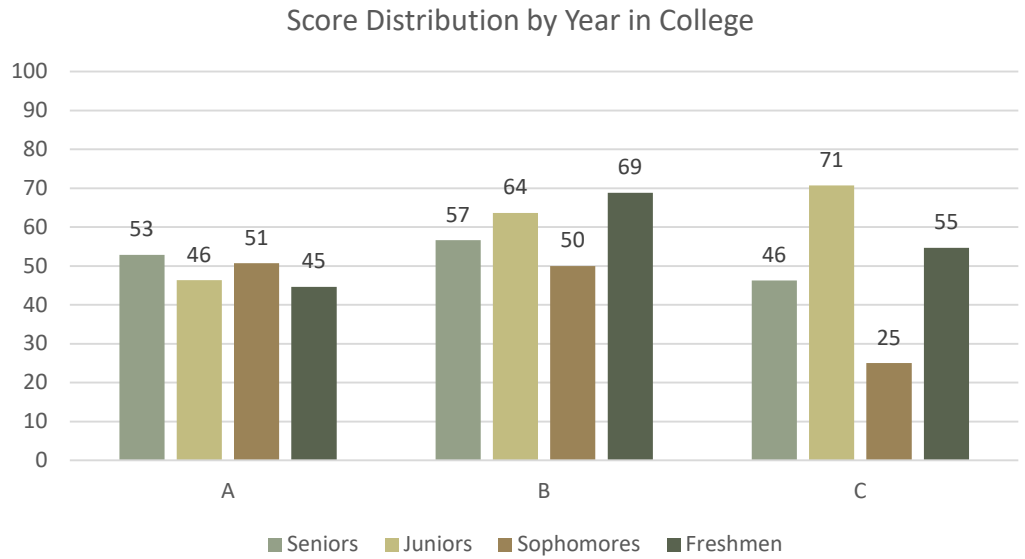
Quantitative Results – Survey Results



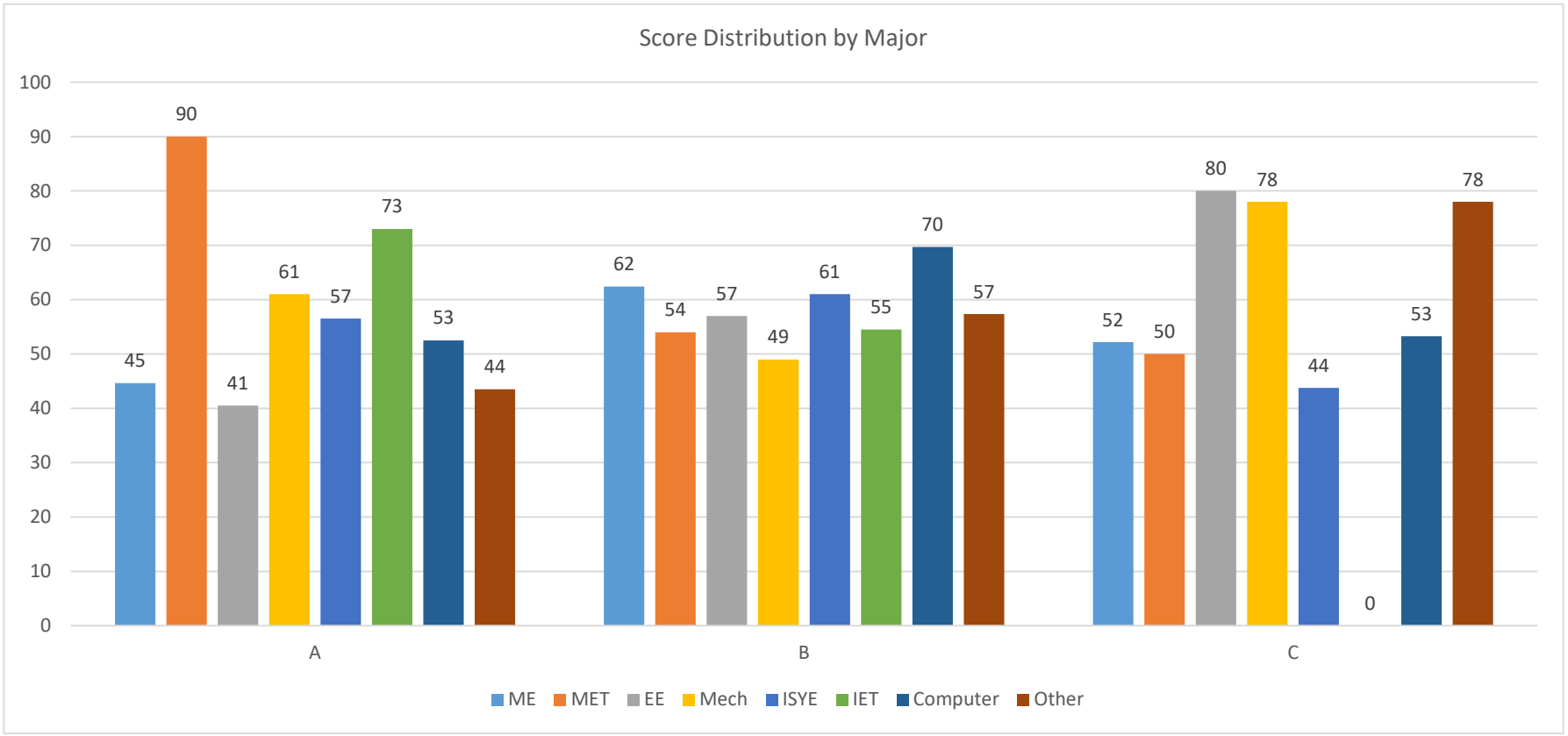


Quantitative Results – Survey Results





Score Distribution by Majors



Quantitative Results – t-test

	A	*B*	*C*	*D*
Mean	50.48	58.50	58.74	70.30
Variance	364.07	335.28	451.93	144.73
Observations	32	34	31	36
		B vs. A	*C vs. B*	*D vs. C*
df		63	60	46
t Stat		1.739	0.048	2.681
P(T<=t) one-tail		0.043	0.480	-0.005
t Critical one-tail		1.669	1.670	1.678
P(T<=t) two-tail		0.086	0.961	0.010
t Critical two-tail		1.998	2.000	2.012

Conclusions

- Students learn in different ways
- They want to try again and again to perform better (if it is fun and challenging)
- Repeating information in different modes re-enforces the material
- Students are more likely to retain information if they read + observe + do

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