Quantitative Reasoning – 2017
Stats of the Week
Level I Analysis

Introduction

This spring marks the second assessment of our student's Quantitative Reasoning (QR) abilities. As you may recall, we are expected to assess the effectiveness of our general education requirements on a regular basis. At this time, we have established three outcomes that we are focusing on – Effective Written Communication, Quantitative Reasoning, and Global & Cultural Awareness. Also, remember that the strategy we have adopted for assessing students across campus is that we realize that it is the expectation that all courses and programs should include and be responsible for emphasizing the importance of these outcomes.

Below is the normal demographic breakdown of the sample of students and some summary statistics. The QR measure was revised and included 17 items that assessed student's ability to interpret, analyze, and calculate various numeric values. The sample consisted of 35 course sections and 750 students. Approximately 510 measures were returned with 431 being valid. I will address the QR results beginning next week. Here, I want you to think about the make-up of our students and what we might be able to do to prevent/avoid many of them dropping out of college.

Demographics

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19 or younger	141	32.7	32.8	32.8
	20-24	146	33.9	34.0	66.7
	25-29	54	12.5	12.6	79.3
	30-34	30	7.0	7.0	86.3
	35-39	25	5.8	5.8	92.1
	40 or older	34	7.9	7.9	100.0
	Total	430	99.8	100.0	
Missing	System	1	.2		
Total		431	100.0		

Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	166	38.5	38.6	38.6
	Female	264	61.3	61.4	100.0
	Total	430	99.8	100.0	
Missing	System	1	.2		
Total		431	100.0		

Race

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	White	238	55.2	55.5	55.5
	African American	74	17.2	17.2	72.7
	Hispanic	31	7.2	7.2	80.0
	Asian	21	4.9	4.9	84.8
	Native American	24	5.6	5.6	90.4
	Two or more	41	9.5	9.6	100.0
	Total	429	99.5	100.0	
Missing	System	2	.5		
Total		431	100.0		

High School

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	GED	30	7.0	7.1	7.1
	Diploma	384	89.1	90.6	97.6
	Neither	10	2.3	2.4	100.0
	Total	424	98.4	100.0	
Missing	System	7	1.6		
Total		431	100.0		

Division

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BIT	92	21.3	21.5	21.5
	ES	50	11.6	11.7	33.2
	HU	34	7.9	7.9	41.1
	SS	76	17.6	17.8	58.9
	HS	141	32.7	32.9	91.8
	Undecided	35	8.1	8.2	100.0
	Total	428	99.3	100.0	
Missing	System	3	.7		
Total		431	100.0		

Credit Hrs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	48	11.1	11.1	11.1
	1-15	132	30.6	30.6	41.8
	16-30	89	20.6	20.6	62.4
	31-45	62	14.4	14.4	76.8
	46-60	52	12.1	12.1	88.9
	61+	48	11.1	11.1	100.0
	Total	431	100.0	100.0	

Num of Colleges

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	270	62.6	63.1	63.1
	1	103	23.9	24.1	87.1
	2 or more	55	12.8	12.9	100.0
	Total	428	99.3	100.0	
Missing	System	3	.7		
Total		431	100.0		

Graduate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	This semester	36	8.4	8.4	8.4
	Next semester	59	13.7	13.8	22.2
	1-2 years	198	45.9	46.4	68.6
	2-3 years	95	22.0	22.2	90.9
	more than 3 years	23	5.3	5.4	96.3
	non-degree seeking	16	3.7	3.7	100.0
	Total	427	99.1	100.0	
Missing	System	4	.9		
Total		431	100.0		

Comments:

First, these data confirm that the sample is a good representation of our population of students. Second, it will provide some comparative analyses that will be presented at a later date.

We must be aware that the vast proportion of our students are less than 24 years of age. In this sample, approximately 67% are in this age group. This should not be surprising, but it does not mean that the older students are not important. Also, note that a large portion of students are 19 or younger. About 33% of our students are 17,18, or 19 and likely to be less academically and socially prepared than necessary for the rigors of college, independence, and life. How can we work with them to improve their success rates? PLANNING COUNCIL??

Gender…realize that we are a female dominated campus…skewed primarily due to the preponderance of females in the health sciences. The racial makeup is not surprising, and the vast percentage of the campus consists of high school graduates.

The sample was fairly representative of the majors on campus. The credit hours completed of the sample again indicates that many students, even in the spring term are still very new to college. Does this indicate that maybe we should develop some strategy for seeking out these second semester, young students to see what support, guidance, and assistance they need or would be helpful?? PLANNERS??

The majority of our students have not attended any other colleges, so they have nothing to compare us to…but, this is likely due to the age statistic. We are their FIRST college…their first, and in some cases, only experience with college…ever.

Lastly, the sample indicates that about 20% of our students are within 2 semesters of graduating. More interestingly, it indicates that 80% of them are one year or more from their expected graduation date. Again, the newness of our student body would explain this.

Conclusion

Initially, I was going to provide some summary statistics in this report pertaining to the QR results. However, after looking at the data, I believe this may be a good time for us to really think about what is here. Planning Council is currently focusing on Goal 1 of the Strategic Plan which addresses improving student retention and success. What can we garner from these simple demographic descriptors that may provide us some clues as to what we can/should do in order to improve our student's success? They are young, inexperienced with college, likely to be academically immature, and seeking a plan for success. Any and all ideas would be greatly appreciated. Please discuss this in your meetings and forward your ideas to anyone on the Planning Council. Hmmm….surely someone has a new idea, or approach to this issue.

Planning Council

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Quantitative Reasoning – 2017
Stats of the Week
Level II Analysis

Introduction

This week we are going to review the results from the QR Assessment. We will summarize the overall results then compare scores across the simple demographic factors that we customarily collect.

Remember, the assessment consisted of 17 items that measured a student's ability to read, interpret, calculate, and critically analyze numerical data

Reliability

One of the statistics that we are often expected to calculate when we conduct any measure of human behavior/ability is a measure of reliability. There are several types of reliability. Reliability can be defined as"

> "*The repeatability of findings. If the study were to be done a second time, would it yield the same results? If so, the data are reliable. If more than one person is observing behavior or some event, all observers should agree on what is being recorded in order to claim that the data are reliable. Reliability also applies to individual measures. When people take a vocabulary test two times, their scores on the two occasions should be very similar. If so, the test can then be described as* **reliable***. To be reliable, an inventory measuring self-esteem should give the same result if given twice to the same person within a short period of time. IQ tests should not give different results over time (as intelligence is assumed to be a stable characteristic). "*

The statistical measure of reliability for the QR Assessment was:

Reliability Statistics

Cronbach's Alpha	N of Items
.717	17

This statistic measures what is called "internal consistency". Do the items relate to the same dimension, or are the measuring the same thing? A value of .70 and above is acceptable in most instances. For us to have this score when students were not terribly motivated to put forth maximum effort, and many just guessed, I believe is very favorable. So, interpretively, we can conclude that the items on the measure do apparently measure the same dimension, which we are referring to as Quantitative Reasoning. We can conclude that the scores would be consistent over time.

Results

2017 QR Assessment

Score

Mean	N	Std. Deviation
.5657	v431	.20467

NumCorrect

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	.2	.2	.2
	3	16	3.7	3.7	3.9
	4	16	3.7	3.7	7.7
	5	22	5.1	5.1	12.8
	6	31	7.2	7.2	20.0
	7	38	8.8	8.8	28.8
	8	50	11.6	11.6	40.4
	9	45	10.4	10.4	50.8
	10	37	8.6	8.6	59.4
	11	41	9.5	9.5	68.9
	12	31	7.2	7.2	76.1
	13	38	8.8	8.8	84.9
	14	23	5.3	5.3	90.3
	15	23	5.3	5.3	95.6
	16	13	3.0	3.0	98.6
	17	6	1.4	1.4	100.0
	Total	431	100.0	100.0	

Score

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.12	1	.2	.2	.2
	.18	16	3.7	3.7	3.9
	.24	16	3.7	3.7	7.7
	.29	22	5.1	5.1	12.8
	.35	31	7.2	7.2	20.0
	.41	38	8.8	8.8	28.8
	.47	50	11.6	11.6	40.4
	.53	45	10.4	10.4	50.8
	.59	37	8.6	8.6	59.4
	.65	41	9.5	9.5	68.9
	.71	31	7.2	7.2	76.1
	.76	38	8.8	8.8	84.9
	.82	23	5.3	5.3	90.3
	.88	23	5.3	5.3	95.6
	.94	13	3.0	3.0	98.6
	1.00	6	1.4	1.4	100.0
	Total	431	100.0	100.0	

Comments: The first table represents the average score (100 pt. scale) for the students who took the QR assessment. Of the 431 valid scores, the average proportion of correct answers was approximately 0.57. The other tables break the scores down into the how many students answered each number of questions correctly, with the last table converting this into the number of students that received each score.

So, what does this tell us? At first glance, 0.57 is not a positive outcome, but remember, these students had little external incentive to do their best work. On a positive note, we see that 65 students, or 15% of the students answered 80% or more correctly. Also, we can see that the largest concentration of scores is between .47 and .65.

After conferring with some math faculty, they report that these scores are reflective of what they see in their classrooms. These are math students in math classes…so, it should not surprise us when we recall that the sample of students consisted of student across campus in classes across all divisions and at all levels.

Now, how does this compare to the 2014 QR Assessment?

2014 QR Assessment

Score

Mean	N	Std. Deviation
53.2976	457	21.48651

Score

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	.4	.4	.4
	9.00	7	1.5	1.5	2.0
	18.00	29	6.3	6.3	8.3
	27.00	43	9.4	9.4	17.7
	36.00	59	12.9	12.9	30.6
	45.00	62	13.6	13.6	44.2
	55.00	64	14.0	14.0	58.2
	64.00	72	15.8	15.8	74.0
	73.00	53	11.6	11.6	85.6
	82.00	39	8.5	8.5	94.1
	91.00	22	4.8	4.8	98.9
	100.00	5	1.1	1.1	100.0
	Total	457	100.0	100.0	

The first table describes the overall average, and the second reports the frequency of the different scores (these are in % terms). While the average score did increase by .03, the frequency of scores does not appear to be much different

My conclusion? It appears as if there has not been a notable increase in the overall score. Actually, it has remained relatively stable with the difference is not statistically significant. The good news? It has increased, but we cannot say with 95% certainty that the increase is due to an improvement in the QR competencies of our population of students. It does appear as if there may be an improvement. We must also consider that the two measures were different…slightly. This may have played a part.

Categorical Comparisons

Score * Age

Score

Age	Mean	N	Std. Deviation
19 or younger	.6012	141	.20293
20-24	.5645	146	.20881
25-29	.5632	54	.18588
30-34	.5333	30	.22060
35-39	.5176	25	.21613
40 or older	.5000	34	.18044
Total	.5663	430	.20449

Score * Sex

Score

Sex	Mean	N	Std. Deviation
Male	.6060	166	.22855
Female	.5397	264	.18402
Total	.5653	430	.20469

Score * Race

Score

Race	Mean	N	Std. Deviation
White	.6107	238	.19804
African American	.4340	74	.17218
Hispanic	.5598	31	.20651
Asian	.5882	21	.17939
Native American	.5123	24	.18881
Two or more	.5610	41	.21935
Total	.5652	429	.20492

Score * High School

Score

High School	Mean	N	Std. Deviation
GED	.5353	30	.17972
Diploma	.5689	384	.20564
Neither	.6176	10	.22053
Total	.5677	424	.20414

Score * Division

Score

Division	Mean	N	Std. Deviation
BIT	.5844	92	.22383
ES	.6847	50	.20644
HU	.5606	34	.19921
SS	.5619	76	.18882
HS	.5428	141	.18593
Undecided	.4639	35	.19075
Total	.5667	428	.20467

Score * Credit Hrs

Score

Credit Hrs	Mean	N	Std. Deviation
0	.4865	48	.19519
1-15	.5463	132	.20513
16-30	.5466	89	.18627
31-45	.5787	62	.23022
46-60	.6391	52	.18784
61+	.6373	48	.19045
Total	.5657	431	.20467

Score * Num of Colleges

Score

Num of Colleges	Mean	N	Std. Deviation
0	.5588	270	.20614
1	.5614	103	.19575
2 or more	.6257	55	.19782
Total	.5680	428	.20338

Score * Graduate

Score

Graduate	Mean	N	Std. Deviation
This semester	.6422	36	.20249
Next semester	.5862	59	.20376
1-2 years	.5556	198	.19670
2-3 years	.5319	95	.20787
more than 3 years	.4910	23	.17068
non-degree seeking	.7390	16	.18473
Total	.5652	427	.20357

Comments: Some interesting trends here. Look at Score x Age…the older the student, the lower the average score. I am encouraged that the youngest category scored the highest. I would have assumed that the younger students would have been less motivated to put forth maximum effort. Males scored higher than females, whites scored the highest, those with a high school diploma scored higher than those with a GED, but those with neither (concurrent students??) scored the highest. ES majors clearly scored the highest, and those closer to graduation scored higher than those with less credit hours accumulated. Those who have attended 2 or more other colleges scored higher than those with less colleges attended, and those expecting to graduate this semester scored much higher than those graduating further into the future.

One potentially encouraging trend is the credit hours and graduate data. We can assume that part of this improvement is due to the QR competency improvement that goes along with attending college longer (learning has occurred). However, some of the improvement has to do with the differences in the groups…those who are further away from graduation will include students who will not make it to graduation…so, those graduating this semester are the survivors, those who are better equipped to succeed in college.

Conclusion

Since spring break is just around the corner, I thought it best to provide this data summary as early as possible to allow adequate recovery time. Some summary thoughts:

1. As with Effective Writing, it is NOT the sole responsibility of the mathematics faculty to reinforce the importance of and teach Quantitative Reasoning competencies to our students. We must all have our students practice and be expected to accurately describe and interpret numerical values.
2. The scores did improve…slightly. There is more work to do.
3. I have learned that good writing and mathematical abilities are not the norm…they are both difficult and rare. It is sometimes hard for us to understand

this given our background and attributes (college educated and graduates). We should continue to work at developing strategies for making what we find easy, or less challenging, the same for our students.

4. This wraps-up the QR Assessment…on to Student Satisfaction – Facilities.
5. I'm ready for spring break.