Academic Success and Students Satisfaction

The Vice-Chancellor's Office for Quality
Universidad de Oviedo

Overview

This is a study of an student and lecturer survey on teaching. It is a pilot project, carried out during the 1999-2000 academic year at the University of Oviedo, correlating the results of the survey and ratios of academic success in an attempt to gauge the extent to which the degree of student satisfaction with the teaching they have received is dependent on having been academically successful in the subject rated in the survey. Results point to there being several advantages of the survey methodology over conventional methods, as well as showing that, generally speaking, students are more satisfied with teaching in subjects with a higher pass rate, though satisfaction levels fall for optional subjects when pass rates are higher. This correlation between performance and expectations is a good predictor of satisfaction with the teaching that was imparted.

Key words: Academic success, Performance, Satisfaction, Analysis of Variance, Reliability, Factor Analysis.

1. HOW THE STUDY WAS ORGANISED.

The efficiency of university teaching and the levels of student satisfaction have been a common focus of academic work of great import to the university system and its quality control (Tejedor, J[1], 2002).

As part of its process of progressively reintroducing teacher evaluation, the University of Oviedo has extended its satisfaction survey to include students and lecturers in all courses. The procedure involved filling in a questionnaire after the summer break so that students and teaching staff could evaluate the teaching imparted in the previous course.

Furthermore, performance in each subject is analysed yearly and presented in a report that includes several yardsticks for each course, including latest enrolment figures, number of classes taught per subject, pass rates and performance per subject, drop-out and graduation rates, alongside the average time required to complete each of the courses offered by the University of Oviedo and the average for Spanish universities as a whole.

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[1] La Complejidad Universitaria del Rendimiento y la Satisfacción. En L.M. Villar. La Universidad. Evaluación Educativa e Innovación Curricular. Kronos, Sevillas. pp 3-40.

The aim of the study is to analyse the link between academic results and student satisfaction with the teaching they received by comparing the marks given by the students to each lecturer in the satisfaction survey with examination pass rates and performance in the same lecturer's subject.

47,744 valid satisfaction questionnaires were returned by students, with 6,354 students out of a possible 28,312 taking part. The response rate is therefore 22.4%.

As the survey was voluntary, students wishing to express complaints might be more expected to reply. However, a number of control variables, such as lecture attendance rates, were applied in order to measure the goodness and validity of the consultation. Assuming that individuals were telling the truth, no anomalous circumstances were detected in the profile of students who responded to the survey (Harvey, L., 2003).[2]

One objective way to measure the success of subjects is by the number of passes. This study did indeed apply *exam pass and performance rates,* defined as the percentage of passes compared to students sitting the exam and the percentage of passes compared to the number of students enrolled in the subject respectively, i.e.

$$\text{Performance Rate} = \frac{\text{Exam Passes}}{\text{Registered Students}} \times 100$$

$$\text{Pass Rate} = \frac{\text{Exam Passes}}{\text{Students Sitting the Exam}} \times 100$$

A study of the two rates will provide an analysis not only of the direct link between satisfaction and success but also of student expectation as it changes over a particular course. This will be expressed as the difference between the number of students enrolled and the number of students sitting examinations. Our hypothesis is that this adjustment of expectations largely determines satisfaction with teaching staff and the teaching imparted.

2. EXAM PASS RATES, PERFORMANCE AND SATISFACTION

The average pass rate for the subjects covered by the study for the 2001/2002 academic year was 70.3%, and the equivalent performance rate was 59.7%. Logically, correlation between the two variables is very high, with a Pearson correlation coefficient of 0.80

Table 1.- Descriptive Statistics

	Mean	s.d.	Min	P(25)	P(50)	P(75)	Max	n
Enrolments	148,88	152,59	8	59	101	172	1218	1462
Pass Rate	70,26	18,64	36,40	56,60	68,50	85,10	99,00	1462
Performance	59,73	20,96	5,00	43,98	60,14	76,66	100,00	1462

s.d.; Standard Deviation, **Min;** minimum, **P(25), P(50), P(75);** percentiles 25, 50, 75, **Max;** maximum, **n;** number of subjects

Grouping subjects according to general satisfaction with teaching shows that over 77% of our students score satisfaction at over five, and 12.3% mark at over 8.

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[2] Student feedback. Quality in Higher Education, 9 (1), pp.3-20.

Table 2.- Satisfaction

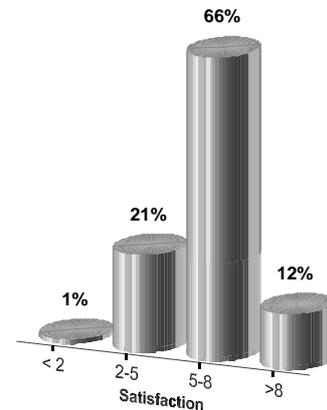|	n	%	Accumulated%
<2	19	1,3	1,3
2-5	307	21,0	22,3
5-8	956	65,4	87,7
>8	180	12,3	100,0
Total	1462	100,0	

Fig. 1- The spread of satisfaction scores.

3. THE MAIN COMPONENTS OF SATISFACTION

Student evaluation of satisfaction is highly correlated throughout the items of the questionnaire, and the principal components (Table 3) indicates how the first factor, linked to item 15 on 'overall satisfaction with the lecturer's work', explains just over 65% of total variance. When a second factor, linked almost completely to item 14 on 'satisfaction with the physical setting in which teaching is imparted', is considered, the percentage of total variance that is explained rises to 72%. These two questions of general satisfaction with teaching staff and physical teaching conditions are therefore the two sources of variance in the questionnaire.

The component analysis (Table 3) shows that all the original items are well identified by the two factors that were highlighted, and the components (Table 4) similarly indicates that the first factor explains all the initial variables except *Resources*, which is explained by the second component.

Table 3.- Explained overall variance

Component	Initial Autovalues			Sat. Sq. Sum. extraction			Sat. Sq. Sum rotation		
	Total	% variance	% accum.	Total	% variance	% accum.	Total	% variance	% accum.
Overall satifaction	7,810	65,082	65,082	7,810	65,082	65,082	7,385	61,544	61,544
Resources	,888	7,404	72,486	,888	7,404	72,486	1,313	10,941	72,486
3	,717	5,972	78,458						
4	,557	4,638	83,095						
5	,466	3,884	86,980						
6	,368	3,064	90,043						
7	,317	2,641	92,685						
8	,263	2,193	94,877						
9	,234	1,947	96,824						
10	,160	1,334	98,158						
11	,121	1,009	99,167						
12	9,991E-02	,833	100,000						

Extraction Method: Análisis of Main Components.

Table 4.- Matrix of components

COMPONENTS	Initial	Extractón
Course content	,789	
Course assignments	,809	
Exam marking	,819	
Exam information	,653	
Subject knowledge	,826	
Ability to explain	,877	
Teaching material	,820	
Attitude	,884	
Personal Relations	,878	
Tutoring	,871	
Resources		,896
Overall satisfaction	,924	

As factor analysis demonstrates that the two highlited factors correspond to a great degree with the variables of *Satisfaction* and *Resources,* these will be used henceforth so as to maintain the original references.

A further interesting reference on the student satisfaction questionnaire relates to reliability, which scores 0.948 on Cronbach's alpha test (the appendix provides further details on this test).

4. THE RELATIONSHIP BETWEEN ACADEMIC SUCCESS AND STUDENT SATISFACTION

The analysis covered 1,462 subjects and excluded subjects with less that 8 student enrolled on the course and those that were evaluated by fewer than five students.

An analysis of the link between success and satisfaction (figure 2) points to there being high values for both variables; no 'anomalous' patterns are found in the position of the subjects in any of the quadrants.
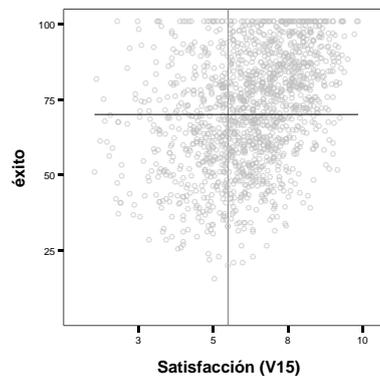.

Figure 2.- Scatter diagram of overall satisfaction (V15) and success per subject.

When all the subjects are considered as a whole, satisfaction is clearly seen to increase in line with success. However, the correlations obtained are low, with a Pearson correlation coefficient of 0.352, ranging between 0.257 for studies in the Humanities and 0.413 for Experimental Sciences

4.1. OVERALL SATISFACTION AND 'SUCCESS GROUPS'.

Given the wide variety in the success rate across different types of subjects, we divided the population into five groups (G1-G5) with roughly the same number of subjects in each of them. Table 5 describes *the Satisfaction, Success* and *Performance* variables for each of the groups that were formed.

Table 5.- Descriptive data by Groups

	Satisfaction with conditions. (V14)					Satisfaction with teaching. (V15)					Success					Performance				
	Mean.	s.d.	Min	Máx	N	Mean	s.d	Min	Máx	N	Mean.	s.d.	Min	Máx	N	Mean.	s.d.	Min	Máx	N
G1	5,73	,96	3,13	8,67	292	5,38	1,46	1,00	9,17	292	42,61	7,81	14,70	52,94	292	35,12	12,23	5,00	72,73	292
G2	5,78	1,11	1,43	8,17	293	5,84	1,39	1,22	9,00	293	59,63	3,50	53,09	65,81	293	49,49	13,29	16,00	91,49	293
G3	5,77	1,11	1,50	9,00	293	6,10	1,57	1,33	9,23	293	71,33	3,33	65,85	77,00	293	60,39	13,81	11,11	93,48	293
G4	5,79	1,26	1,14	8,83	292	6,78	1,42	1,07	9,50	292	82,34	3,25	77,08	88,79	292	72,25	12,75	22,22	100	292
G5	5,78	1,41	1,00	9,00	292	6,85	1,60	1,78	9,83	292	95,51	3,91	88,89	100	292	81,41	13,54	23,81	1000	292

The standard tests used for contrasting normality confirm the hypotheses required for parametric tests. Subsequent ANOVA results (Table 6) indicate significant differences between "subject success groups" as far as general satisfaction is concerned, but not as far as assessment of resources and the physical teaching environment is concerned.

Table 6.- ANOVA by success groups

		Square Sum.	df	Square Mean.	F	Sig.
	Inter-groups	,759	4	,190	,136	,969
Resources	Intra-groups	2027,771	1457	1,392		
	Total	2028,530	1461			
	Inter-groups	461,994	4	115,498	52,0	,000
Satisfaction	Intra-groups	3235,120	1457	2,220		
	Total	3697,114	1461			

Post hoc Student-Newman-Keuls tests show that differences in the average satisfaction values (Table 7) increase to a significant extent in all groups except the last two, where no significant differences are observed.

Table 7.- Means values for satisfaction

		N	Subsets for alfa = .05			
'SUCCESS GROUPS'			1	2	3	4
G1	[0, 53)	292	5,37			
G2	[53, 65.85)	293		5,83		
G3	[65.85, 77)	293			6,10	
G4	[77, 88.8)	292				6,78
G5	[88.8, 100]	292				6,85
	Sig.		1,00	1,00	1,00	,57

4.2 SUCCESS AND PERFORMANCE BY 'SATISFACTION GROUPS'

Having established the basic relationship between satisfaction and academic success, interests shifted towards a more in-depth analysis of the influence exerted on satisfaction by the components associated to the success rate relative to the number of students who responded to the survey (n), and to variation in student expectation between enrolled students and students sitting the examinations, which is expressed as the difference between Success and Performance rates.

Table 8.- ANOVA per satisfaction groups

		Square Sum.	df	Square Mean.	F	Sig.
n	Inter-groups	34545,421	3	11515,140	15,973	,000
	Intra-grupos	1051064,503	1458	720,895		
	Total	1085609,924	1461			
Success	Inter-groups	51734,783	3	17244,928	53,971	,000
	Intra-groups	465866,251	1458	319,524		
	Total	517601,033	1461			
Performance	Inter-groups	64754,341	3	21584,780	54,506	,000
	Intra-groups	577378,891	1458	396,007		
	Total	642133,233	1461			
Success-Perf..	Inter-groups	1379,044	3	459,681	2,931	,033
	Intra-groups	228692,682	1458	156,854		
	Total	230071,726	1461			

A comparison of success and performance rates according to satisfaction groups (Table 8) shows that the differences are highly significant, as also are the differences between the number of students responding to the survey (n), and the new variable Success-Performance, or expectation adjustment.

Table 9.- Pass Rate

	N	Subset for alfa = .05		
Satisfaction (V15)		1	2	3
<2	19	58,57		
2-5	307	62,54		
5-8	956		70,53	
>8	180			83,34
Sig.		,209	1,000	1,000

Table. 10.- Performance

	N	Subset for alfa = .05			
Satisfaction (V15)		1	2	3	4
<2	19	40,95			
2-5	307		51,15		
5-8	956			60,21	
>8	180				73,72
Sig.		1,000	1,000	1,000	1,000

Table 11.- Number of Surveys

	N	Subset for alfa = .05	
Satisfaction (V15)		1	2
>8	180	15,63	
<2	19		26,74
2-5	307		29,88
5-8	956		30,56
Sig.		1,000	,699

Table 12.- Success-Performance

	N	Subset for alfa = .05	
Satisfaction (V15)		1	2
<2	19	17,6207	
2-5	307		11,3969
5-8	956		10,3122
>8	180		9,6225
Sig.		1,000	,702

Post hoc Student-Newman-Keuls tests point to the conclusion that higher satisfaction levels correspond to those subjects where there are enrolled fewer undergraduates (an average of 16; cf. Table 11), and those where there are higher success and performance ratios (c.f. Tables 9 and 10).

As for the issue of expectation adjustment, confirmation is made of the initial hypothesis regarding a link between satisfaction and the adjustment of performance rates and pass rates or of registration figures and numbers of students sitting examinations (Table 12).

5. SUCCESS / SATISFACTION RATIOS ACCORDING TO TYPES OF STUDY.

Finally, we analysed the relationship between success and satisfaction when subjects were grouped according to the type of qualification that they led to (Table 13). This led to the following distribution of averages for success and performance ratios, and for satisfaction with resources and overall teaching (Resources and Satisfaction respectively).

Table13.- Frecuency by TYPE OF STUDIES

	N	*%*	**Perf.**	**Succes.**	**Resources**	**Satisfaction**
SOCIAL AND LEGAL SCIENCES	497	34,0	60,13	70,63	5,68	6,36
EXPERIMENTAL SCIENCES	184	12,6	61,82	68,53	6,32	6,30
HEALTH SCIENCES	75	5,1	82,31	85,39	4,77	6,28
HUMANITIES	156	10,7	59,82	74,00	5,78	6,16
INGENIERING STUDIES	550	37,6	55,55	67,39	5,81	5,99

These values indicate higher performance ratios and success in the field of Health Sciences, and a greater mismatch in the same ratios in the Humanities and Ingeniering degrees.

If subjects are divided by squares, according to success and satisfaction, (figure 3), this distribution shows that there is a more direct link between success/performance and satisfaction (squares 1 and 3), in Health Science courses and that Humanities degrees are most often located in squares two and four (low success and high satisfaction or high success and low satisfaction), thus highlighting the fact that, although differences are not significant (p- value 0.944), other variables apart from academic success are nevertheless affecting satisfaction.
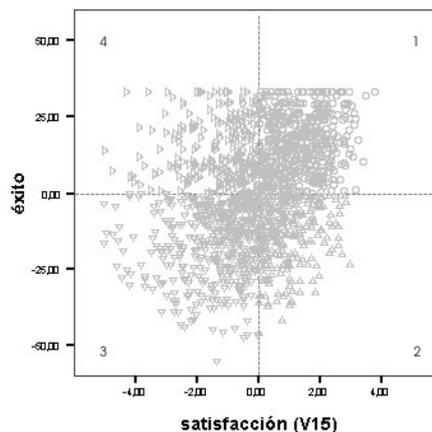

Figure 3.- Scatter graph of subjects by squares.

Table 14-. Type of study by square

		Subjects in Squares				Total
		1	2	3	4	
HEALTH SCIENCES	N	28	11	24	12	75
	%T. EST.	37,3%	14,7%	32,0%	16,0%	100,0%
EXPERIMENTAL SCIENCES	N	66	34	56	28	184
	% T. EST.	35,9%	18,5%	30,4%	15,2%	100,0%
SOCIAL AND LEGAL SCIENCES	N	164	91	155	87	497
	% T. EST.	33,0%	18,3%	31,2%	17,5%	100,0%
HUMANITIES	N	51	35	42	28	156
	% T. EST.	32,7%	22,4%	26,9%	17,9%	100,0%
INGENIERING	N	185	113	170	82	550
	% T. EST.	33,6%	20,5%	30,9%	14,9%	100,0%
Total	N	494	284	447	237	1462
	% T. EST.	33,8%	19,4%	30,6%	16,2%	100,0%

7. CONCLUSIONS.

The main conclusions that come to light out of this correlation study of academic success, expressed as the pass rate of students sitting the exam, and satisfaction with teaching, are the following:

1. The teaching evaluation questionnaire deals with two factors. One relates to general satisfaction, including all the facets related to the dynamics of teaching and learning, and the other relates to the physical environment where teaching is imparted. These issues coincide with those described by other researchers (Aldridge, S.& Rowley, J., 1998)[3]. The high level of reliability of the questionnaire means that its results can be used as a measure of satisfaction levels with teaching and its link with academic success

2. The diverse typology and fields of study of the subjects makes any general relationship between academic success and satisfaction difficult to confirm. However, when subjects are grouped according to success levels, there are clear indications that satisfaction with teaching is greater in the higher pass rate groups (the success ratio).

3. The difference between enrolments in a subject and examinees is confirmed as a variable affecting the relationship between success and satisfaction; higher levels of dissatisfaction are observed in subjects in which large numbers of enrolled students fail to sit their exams, after not seeing their learning expectations fulfilled.

4. Finally, it is noteworthy that the variations noted in the success/satisfaction relationship according to types of study have a certain homogeneity about them with a predominance of a direct relationship between the both variables; however, in the Humanities degrees, there is somewhat greater dispersion, as the inverse relationship is more common. One of the outcomes is that there is a need for more in-depth analysis based on specific subjects and options, so as to flesh out the quality infrastructure of university teaching.

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[3] Measuring customer satisfaction in higher education. Quality Assurance in Education, 6 (4) pp. 197-204

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Apéndice

It is showed that the correlations matrix for the items of student satisfaction questionnaire.

Table A.1.- Correlations

		V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15
V4	C.P.	1,00	0,71	0,67	0,52	0,67	0,64	0,58	0,65	0,59	0,57	0,29	0,66
	Sig.	,	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	N	47551	47261	47175	47013	47490	47468	46808	47481	47456	47329	47475	47494
V5	C.P.	0,71	1,00	0,68	0,50	0,61	0,66	0,65	0,64	0,62	0,63	0,32	0,70
	Sig.	0,00	,	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	N	47261	47312	46965	46790	47263	47243	46632	47257	47234	47120	47248	47261
V6	C.P.	0,67	0,68	1,00	0,55	0,62	0,67	0,63	0,65	0,65	0,66	0,26	0,74
	Sig.	0,00	0,00	,	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	N	47175	46965	47240	46960	47180	47161	46540	47168	47148	47027	47166	47179
V7	C.P.	0,52	0,50	0,55	1,00	0,52	0,48	0,48	0,52	0,51	0,49	0,24	0,53
	Sig.	0,00	0,00	0,00	,	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	N	47013	46790	46960	47093	47015	46997	46432	47011	46991	46874	47004	47027
V8	C.P.	0,67	0,61	0,62	0,52	1,00	0,75	0,62	0,78	0,66	0,62	0,27	0,73
	Sig.	0,00	0,00	0,00	0,00	,	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	N	47490	47263	47180	47015	47606	47566	46857	47557	47528	47405	47539	47558
V9	C.P.	0,64	0,66	0,67	0,48	0,75	1,00	0,72	0,76	0,74	0,74	0,26	0,84
	Sig.	0,00	0,00	0,00	0,00	0,00	,	0,00	0,00	0,00	0,00	0,00	0,00
	N	47468	47243	47161	46997	47566	47581	46843	47532	47505	47383	47516	47532
V10	C.P.	0,58	0,65	0,63	0,48	0,62	0,72	1,00	0,69	0,69	0,70	0,29	0,74
	Sig.	0,00	0,00	0,00	0,00	0,00	0,00	,	0,00	0,00	0,00	0,00	0,00
	N	46808	46632	46540	46432	46857	46843	46888	46844	46826	46737	46817	46844
V11	C.P.	0,65	0,64	0,65	0,52	0,78	0,76	0,69	1,00	0,81	0,77	0,28	0,80
	Sig.	0,00	0,00	0,00	0,00	0,00	0,00	0,00	,	0,00	0,00	0,00	0,00
	N	47481	47257	47168	47011	47557	47532	46844	47609	47553	47424	47534	47565
V12	C.P.	0,59	0,62	0,65	0,51	0,66	0,74	0,69	0,81	1,00	0,89	0,28	0,83
	Sig.	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	,	0,00	0,00	0,00
	N	47456	47234	47148	46991	47528	47505	46826	47553	47587	47427	47514	47545
V13	C.P.	0,57	0,63	0,66	0,49	0,62	0,74	0,70	0,77	0,89	1,00	0,29	0,84
	Sig.	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	,	0,00	0,00
	N	47329	47120	47027	46874	47405	47383	46737	47424	47427	47454	47388	47419
V14	C.P.	0,29	0,32	0,26	0,24	0,27	0,26	0,29	0,28	0,28	0,29	1,00	0,31
	Sig.	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	,	0,00
	N	47475	47248	47166	47004	47539	47516	46817	47534	47514	47388	47603	47563
V15	C.P.	0,66	0,70	0,74	0,53	0,73	0,84	0,74	0,80	0,83	0,84	0,31	1,00
	Sig.	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	,
	N	47494	47261	47179	47027	47558	47532	46844	47565	47545	47419	47563	47629

Table A.2 shows the reliability results for the students questionnaire given by the Cronbach´s Alpha test

Table A.2.- Reliability Analysis of students questionnaire

		Media	Des. Típica	Corr. Item-Total	Alpha sin Item
1.	V4	6,9413	2,3098	,6291	,9451
2.	V5	6,2809	2,6352	,6409	,9441
3.	V6	6,5098	2,8849	,6448	,9437
4.	V7	6,9269	2,6405	,3901	,9492
5.	V8	7,2257	2,5758	,7023	,9437
6.	V9	5,9727	3,1455	,7710	,9415
7.	V10	5,7470	2,8830	,6253	,9437
8.	V11	6,8173	2,7225	,7828	,9414
9.	V12	6,4292	2,9999	,8397	,9414
10.	V13	5,7964	3,1210	,8353	,9417
11.	V14	5,8972	2,3722	,1289	,9559
12.	V15	6,0225	2,9222	,8501	,9394

Total data considered: 45905
Cronbach Alpha Coefficient: 0.9488