Students' Preferences for Teaching Strategies that Strengthen the Learning of Economics in Middle Eastern Universities

Mokhtar M. Metwally
and
Nelson Perera
University of Wollongong

Abstract

A survey, covering a random sample of 139 students, was conducted at the University of Wollongong in Dubai during the months of September-November 2004, to gather opinions of students about their attitudes towards strategies that promote the teaching and learning of economics The technique of factor analysis was used to model the preference of students for various strategies. Multiple discriminant analysis was used to find out whether there are any significant differences in the attitudes of students at different stages :"students learning introductory economic subjects", "students learning intermediate economic subjects" and "students learning advanced and applied economic subjects" Factor scores were used as predictive variables in multiple discriminant analysis to test students' attitudes.

Introduction

In its most basic sense, economics is an academic discipline which focuses on attempts by individuals and societies to satisfy their extensive wants in a situation of scarcity. In doing so it gives extensive attention to the organization and control of the means of production, distribution and exchange of goods and services. The teaching of economics is done into three main areas: economic theory (micro, macro. trade, etc.), quantitative economics (economic statistics, mathematical economics, econometrics, operations research), and applied economics (industrial economics, managerial economics, financial economics, economic planning, economic development etc.)

Learning economics enables a student to analyze: what, how and for whom society produces. The knowledge in both positive and normative economics enlightens the way to understand how to improve the quality of life. Positive economics studies how the economy actually behaves and normative economics makes perceptions about what should be done (Begg et al, 2003). Good theory and interesting applications are not mutually exclusive. Economic principles are linked with real world issues. Both micro and macro economics emphasize the importance of decision mechanisms for economic welfare (Schiller, 2003)

In recent years, economic knowledge has changed dramatically. Theories have been extended and developed, partly in response to new ideas such as "commitment", partly to new empirical findings and partly to the arrival of new tools such as computer simulations. This development has an important impact on interdisciplinary courses. As an example, development of knowledge in industrial economics, besides its significance for students of business behavior, helps in analyzing inter-relations between industrial structure, organization and efficiency: in both the static and dynamic senses (Stesd et al, 1997)

Learning mathematical economics, economic statistics, operations research and other quantitative techniques enables the student to express economic theory in mathematical form, to collect, process, present and analyze data and to solve the decision-problems that confront and confound managers in both the private and public sector . Most, if not all economic students, need to learn econometrics, which is an amalgam of economic theory, mathematical economics, economic statistics and mathematical statistics, in order to conduct empirical research in economics and other social and behavioral sciences. (Guarati, 2003, Badani et al, 1996 and Taylor, 2004)

Enrolment in economics, as a major field of specialization has been subject to fluctuations as well as a decline in many universities. Actually, faculties of commerce and colleges of business in most private universities offer degrees in accounting and finance, business administration or management, and marketing, while teach economics as a supplementary course by selecting a number of economic subjects in the three areas mentioned above. Some express the view that one of the reason for not offering a degree in economics is due to lack of enrollment because of difficulties in learning economic subjects. It is claimed that the students need teaching strategies that simplify the learning of theoretical and technical aspects. Also the students want a slice of reality in their college courses (Danial, 1996 and Ellis and Mathis, 1985).

There are no studies related to students' preferences for teaching strategies that strengthen the leaning of economics in Middle Eastern universities. However there is a vast body of literature related to teaching strategies of economics, declining number of students taking economics and students' perceptions on economics at American and Australian universities.

Millmove (1995) reports that student numbers have fallen in economics majors because students visualize economics as preoccupied with theory yet lacking relevance to current issues. Lewis and Norris (1997) suggest that this decline takes place because recent job opportunities seem to focus more on business degrees than economics degrees and business studies degrees are seen as leading to higher paid jobs and economics is considered too rigorous.

A survey conducted by Hodgkinson and Perera (1996) on first year students' attitudes towards learning economics at the University of Wollongong in Australia suggests that the students think that teaching of introductory courses in economics is rigorous but boring and does not encourage students to specialize in that field.

A survey conducted by Haslehurst, Hoskins and Thorper (1998) suggests that a large number of Australian undergraduate and postgraduate students believe that contents of many economics courses are out of touch with the real world.

Brue (1996), Kenely and Hellier (2001), Millmow(1997), and Salemi and Siegfried (1999) argue that economic courses need to focus more on the customer and introduce courses, which have a customer focus rather than a producer focus..

The aim of this paper is to test students' preferences for teaching strategies that strengthen the learning of economics. A survey, covering a random sample of 139 students, was conducted at the University of Wollongong in Dubai during the months of September-November 2004[1]. The technique of factor analysis was used to model the preference of students for various strategies. Multiple discriminant analysis was used to find out whether there are any significant differences in the attitudes of students at different stages :"students learning introductory economic subjects", "students learning intermediate economic subjects" and "students learning advanced and applied economic subjects" Factor scores were used as predictive variables in multiple discriminant analysis to test students' attitudes.

This paper is divided into four sections. Section one examines the main characteristics of the sample. Section two summarizes the results of factor analysis. Section three uses factor scores as predictors in multiple discriminant analysis. Finally, section four summarizes the main conclusions of the paper.

Main Sample Characteristics

Before going into data collection, preparation and analysis, two focus groups were interviewed. Each group has a size of 10 (pre-screened) respondents. A large percentage of members of the focus groups expressed interest in continuing to learn economics. However, some 90% of those members suggested a number of strategies that could promote the teaching and learning of economic subjects and motivate students to study for higher degrees in economics.

Following the focus groups interviews, a survey was conducted during the three months of September-November 2004. The survey covered a sample of 139 students at the University of Wollongong in Dubai. The

[1] The degree program at the University of Wollongong in Dubai (UOWD) is the same as that of Wollongong University in Australia (UOW). The contents and quality of subjects offered at the Dubai campus is monitored annually by the subject coordinators at UOW in Australia.

sample size was determined using 95 percent confidence level; 0.05 level of precision and a 0.9 population proportion.

The respondents were selected at random using the list of student ID number and were asked, through personal interview, to indicate their degree of agreement with 15 suggested strategies to strengthen the learning of economics using a 10-point scale (1 = strongly disagree, 10 = strongly agree). The suggested strategies are given in Table 1.

Results of Factor Analysis

Students were asked to indicate their degree of agreement with 15 learning and teaching strategies in the field of economics using a 10--point scale. The survey results were analysed using the SPSS program (Coakes and Steed, 1999). Table 2 gives the means and standard deviations of scores of variables related to students' responses. The data in this table suggest that variables related to application of economic theory and quantitative techniques, use of information on the internet, group discussion and presentation and method of assessment, score relatively higher than other variables. On the other hand, the mean scores of variables related to interdisciplinary essays, attendance of lecturers' seminars and invitation of decision makers are relatively smaller than other scores.

Factor analysis was performed on the explanatory variables with the primary goal of data reduction (Muliak, 1972). The statistical results (given in Table 2) reveal high correlation between the majorities of variables. This suggests that factor analysis is appropriate to reduce these highly correlated variables to a small manageable number of factors.

An investigation of the statistical results suggests that the coefficients on the diagonals of the Anti-image correlation matrix are greater than 0.5 for each variable. Hence, there was no need to eliminate any of the variables. The correlation matrix shows that well-over 80% of the coefficients are statistically significant at the 5 percent level of significance. Also, each variable has a significant correlation coefficient with more than one of the other variables. This suggests adequacy of the factor model (Malhotra, 2004 and Metwally, 2000).

Bartlett's test of sphericity was used to test the null hypothesis that the variables are uncorrelated in the population. The test gave a value of 3573.8, which is highly significant favouring a rejection of the null hypothesis [Dillon and Goldstein, 1984]. Also, the Kaiser-Meyer-Olkin [KMO] measure of sampling adequacy was calculated. A value of 0.894 was obtained which indicate that factor analysis is highly appropriate (Hair. et. al, 1992).

Table 2(iii) shows the "final statistics" which give relevant information after the desired number of factors have been extracted (Dunteman, 1989). The table gives the commonalties for the variables, along with the variance accounted for by each factor that is retained. It can be seen that the 15 explanatory variables are reduced to only *three* factors with an eigenvalue

greater than one. The three factors account for approximately 89.4 percent of the total variance. The magnitudes of the residuals reveal that only 5% of the residuals are greater than 0.05 (in absolute value). This suggests goodness of fit.

Table 2(v) gives the rotated factor matrix obtained by the varimax procedure. The data in this table suggest that Factor 1 has high coefficients on the variables which represent: "group discussion", "joint research projects", "group presentation", "using information on the Internet"' "attending staff seminars" and "invitation of decision makers to give special lectures". Therefore, this factor may be labeled "*Information and Group Participation*". Factor 2 has high coefficients on variables representing: "application of quantitative economics to practical research problems", Application of economic theory to other areas of business", "introducing prerequisites to all advanced subjects", Interdisciplinary essays", " use of large number of references" and "intensive use of computer labs". Therefore, this factor may be labeled "*In-depth knowledge and Application*". Factor 3 is highly correlated with variables representing "Use of international editions of textbooks", "reconsideration of methods of assessment" and "drawing detailed subject outlines". Hence, this variable may be labeled "*Assessment and Evaluation*".

Thus, using the principal component method and varimax rotation, the 15 explanatory variables listed in Table 1, have been reduced to the following three factors:

F1: Information and Group Participation
F2: In-depth Knowledge and Application
F3: Assessment and Evaluation

Results of Multiple Discriminant Analysis

The factor scores for the three factors were introduced in multiple discriminant analysis as explanatory variables. The student's level of studying economics was used as the dependent variable. Students of economics were divided into three groups:

Group 1: *First-year economic students:* These are students who study introductory economic subjects. The sample contains 83 of these students. This represents approximately 60% of the sample size.

Group 2: *Second-year economic students:* These are students who study any of intermediate economic theory subjects, mathematical economics, econometrics, operations research and managerial economics. The sample contains 38 of these students. This represents approximately 27% of the sample size.

Table 1: Suggested Strategies to enhance the teaching and learning of economic Subjects

Strategy
1. Using information on the Internet
2. Conducting group discussion
3. Carrying out joint research projects
4. Allowing students group presentation
5. Applying mathematical economics/ econometrics and other quantitative economic techniques to practical research projects
6. Applying economic theory to other areas of business (marketing, finance, industrial relations etc.)
7. Introducing prerequisites to all advanced economic subjects
8. Using international editions of textbooks
9. Attaching no more than 50% of total marks to final examination and no less than 50% to progressive assessment
10.Requesting students to attend staff seminars
11.Inviting economic decision makers to give special lectures
12. Listing a large number of references for each economic topic
13.Encouraging interdisciplinary essays
14 . Intensifying use of computer labs to practice quantitative analysis
15. Specifying in the subject outline how to achieve the subject objectives

Table 2: Results of Factor Analysis

i. Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Group discussion	5.5727	1.99611	139
Joint research Projects	4.9252	2.34777	139
Group Presentation	5.5712	1.94840	139
Applying quantitative economics to practical research problems	5.5009	3.35867	139
Applying economic theory to other areas of business (marketing, finance etc.)	5.4906	2.83572	139
Introducing prerequisites to all advanced subjects	5.3554	2.40121	139
Using international editions of text books	5.3813	1.25009	139
Attaching no more than 50% of total marks to final examination	5.5180	1.43506	139
Interdisciplinary Essays	4.5755	2.95860	139
Using Information on the Internet	5.4964	1.39031	139
Request students to attend staff seminars	4.6978	2.16244	139
Inviting decision makers to give special lectures	4.8345	1.83207	139
Listing large number of references for each topic	5.2446	2.39819	139
Use of computer labs	5.0863	2.84753	139
Determining how to achieve the subject objectives when drawing the subject outline	5.0957	2.01559	139

ii. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.894
Bartlett's Test of Sphericity	Approx. Chi-Square	3573.787
	Df	105
	Sig.	.000

iii. Communalities

	Initial	Extraction
Group discussion	1.000	.838
Joint research Projects	1.000	.888
Group Presentation	1.000	.896
Applying quantitative economics to practical research problems	1.000	.907
Applying economic theory to other areas of business (marketing, finance etc.)	1.000	.935
Introducing prerequisites to all advanced subjects	1.000	.856
Using international editions of text books	1.000	.960
Attaching no more than 50% of total marks to final examination	1.000	.947
Interdisciplinary Essays	1.000	.924
Using Information on the Internet	1.000	.826
Request students to attend staff seminars	1.000	.904
Inviting decision makers to give special lectures	1.000	.848
Listing large number of references for each topic	1.000	.906
Use of computer labs	1.000	.854
Determining how to achieve the subject objectives when drawing the subject outline	1.000	.921
REGR factor score 1 for analysis 1	1.000	1.000
REGR factor score 2 for analysis 1	1.000	1.000
REGR factor score 3 for analysis 1	1.000	1.000

Extraction Method: Principal Component Analysis.

iv. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.416	69.442	69.442	10.416	69.442	69.442	5.492	36.612	36.612
2	1.922	12.812	82.255	1.922	12.812	82.255	3.982	26.549	63.161
3	1.070	7.137	89.391	1.070	7.137	89.391	3.935	26.230	89.391
4	.365	2.431	91.823						
5	.300	2.002	93.824						
6	.246	1.642	95.466						
7	.186	1.241	96.707						
8	.141	.939	97.647						
9	.113	.754	98.400						
10	.077	.515	98.915						
11	.062	.415	99.330						
12	.051	.341	99.671						
13	.020	.132	99.803						
14	.016	.107	99.910						
15	.013	.090	100.000						

Extraction Method: Principal Component Analysis.

v. Rotated Component Matrix(a)

	Component		
	1	2	3
Group discussion	.776	.388	.290
Joint research Projects	.873	.290	.203
Group Presentation	.886	.237	.234
Applying quantitative economics to practical research problems	.395	.640	.584
Applying economic theory to other areas of business (marketing, finance etc.)	.345	.730	.532
Introducing prerequisites to all advanced subjects	.236	.675	.615
Using international editions of text books	-.264	-.147	.932
Attaching no more than 50% of total marks to final examination	-.332	-.220	.888
Interdisciplinary Essays	.376	.772	.433
Using Information on the Internet	.873	.163	.190
Request students to attend staff seminars	.859	.226	.341
Inviting decision makers to give special lectures	.882	.146	.223
Listing large number of references for each topic	.161	.938	-.005
Use of computer labs	.286	.645	.596
Determining how to achieve the subject objectives when drawing the subject outline	-.552	-.551	.559

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 5 iterations.

Group 3: *Third-year economic students:* These are students who study any of advanced economic theory, advanced quantitative economic techniques and concentrate on applied economic subjects (e.g. industrial economics, economic development, international trade, financial economics, globalization, comparative economic systems). The sample contains 18 of these students. This represents approximately 13% of the sample size

Since we have three groups and three predictors, we can estimate two discriminant functions (Klecka, 1980). Table 3 presents the results of estimating three-group discriminant analysis. The following comments can be made about these results:

The univariate F ratios indicates that when the predictors are considered individually, the three factors are significant in discriminating between the three groups

The level of significance of *Box's M* suggests that we should reject the null hypothesis that the covariance matrices are equal (Manly, 1994).

The eigenvalue for function 1 is 3.975 and the eigenvalue for function 2 is 0.893. Function 1 accounts for 83% of the variability while function 2 accounts for the remaining 17% of the between-groups variability.

The Wilks' lambda associated with function 1 is .111. This transforms to a chi-square value of 296.946, which is statistically significant at the 0.000 level of significance. The Wilks' lambda of function 2, after function 1 has been removed, is 0.551. This transforms to a chi-square value of 80.346 which is statistically significant at the 0.000 level of significance. Hence, the second function also contributes significantly to group differences (Morrison, 1969). These results suggest a simultaneous Wilks' lambda = .0612

The canonical correlation for function 1 is 0.894. Hence, the proportion of total variability explained by differences between groups is 80% for this function. The corresponding figures for function 2 are 0.670 and.45%.

The standardized canonical discriminant function coefficients indicate a large positive coefficient for factor 1 (Information and Group Participation) and a large negative coefficient for factor 3 (Assessment and Evaluation) on function 1. The results also suggest a large positive coefficient of factor 2 (In-depth knowledge and Application) on function 2

The unstandardized canonical discriminant function coefficients give the following two discriminant functions:

$$Z_1 = -1.677\,F_1 + 1.486\,F_2 + 2.159\,F_3$$
$$Z_2 = -0.350\,F_1 + 1.323\,F_2 - 1.605F_3$$

The canonical discriminant functions evaluated at group means (group centroids) suggest that group 1 (*First-Year Economic Students)* has a large negative value on function 1 and a small negative value on function 2. . Since the "Assessment and Evaluation" Factor has a large negative sign on

function 1 and a small negative sign on function 2, as revealed by the standard canonical discriminant function coefficients, this suggests that students who start learning economics focus their great emphasis on methods of assessment, structure of subject outline and contents of textbooks.

The functions at group centroids suggest that group 2 (*Second-Year Economic Students)* has a large positive value on both functions. Since Factor 2, which represents "In-depth knowledge and Application" has a positive sign on both functions 1 and 2, as revealed by the standard canonical discriminant function coefficients, this suggests that students who study intermediate economic theory, mathematical economics, econometrics and other quantitative economic techniques feel that they can benefit more in learning these subjects if they can receive more in-depth knowledge by having adequate prerequisites, using rich references, applying economic theory to interdisciplinary courses and concentrate more on application of quantitative techniques through use of computer labs

The canonical discriminant functions evaluated at group means suggest that group 3 (*Third-Year Economic Students)* has a large positive value on function 1 and a negative value on function 2. Since Factor 1, which represents "Information and Group participation" has a positive sign on function 1 and a negative sign on function 2, as revealed by the standard canonical discriminant function coefficients, this suggests that students who study advanced economic theory, advanced quantitative economic techniques and applied economics believe that their learning of these subjects would improve if they can benefit from information available on the Internet, in lecturers' and decision makers' presentation. The discriminant analysis results also seem to suggest that students doing applied economic subjects are interested in having group participation in terms of group discussion, joint research and group presentation

The classification results based on the analysis sample suggest a hit ratio equal to 87.1%. This implies that over 87% of the cases are correctly classified. Since we have three groups of different sizes, a "chance" hit ratio would be $[(83/139)^2 + (38/139)^2 + (18/139)^2] = 44.8\%$. The improvement over chance is more than 25%; indicating at least satisfactory validity (Klecka, 1980). The *Press's Q* statistic is given by:

$$Press's\ Q = \{385-(276)(3)\}^2 / \{385(2)\} = 115.2$$

This value exceeds by far the critical value at a significance level of .01 which is 6.63, suggesting that the predictions are significantly better than chance.

Table 3: Results of Discriminant Analysis

i- Group Statistics

Student Group		Mean	Std. Deviation	Valid N (listwise)	
				Unweighted	Weighted
1.00	REGR factor score 1 for analysis 1	-.4457183	.23697236	83	83.000
	REGR factor score 2 for analysis 1	-.3651082	.81117017	83	83.000
	REGR factor score 3 for analysis 1	-.4332034	.89148635	83	83.000
2.00	REGR factor score 1 for analysis 1	.0279240	.97881260	38	38.000
	REGR factor score 2 for analysis 1	.8812804	1.01108070	38	38.000
	REGR factor score 3 for analysis 1	.8283386	.82458227	38	38.000
3.00	REGR factor score 1 for analysis 1	1.9963061	.75511504	18	18.000
	REGR factor score 2 for analysis 1	-.1769263	.54660172	18	18.000
	REGR factor score 3 for analysis 1	.2488344	.53735690	18	18.000
Total	REGR factor score 1 for analysis 1	.0000000	1.00000000	139	139.000
	REGR factor score 2 for analysis 1	.0000000	1.00000000	139	139.000
	REGR factor score 3 for analysis 1	.0000000	1.00000000	139	139.000

ii-.Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
REGR factor score 1 for analysis 1	.360	120.635	2	136	.000
REGR factor score 2 for analysis 1	.702	28.883	2	136	.000
REGR factor score 3 for analysis 1	.690	30.534	2	136	.000

iii-Test Results

Box's M		193.886
F	Approx.	15.347
	Df1	12
	Df2	12091.752
	Sig.	.000

Tests null hypothesis of equal population covariance matrices.

iv- Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	3.975(a)	83.0	83.0	.894
2	.813(a)	17.0	100.0	.670

a First 2 canonical discriminant functions were used in the analysis.

v- Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	Df	Sig.
1 through 2	.111	296.946	6	.000
2	.551	80.346	2	.000

Canonical Discriminant Function Coefficients

	Function	
	1	2
REGR factor score 1 for analysis 1	-1.677	-.350
REGR factor score 2 for analysis 1	1.486	1.323
REGR factor score 3 for analysis 1	2.159	-1.605
(Constant)	.000	.000

Unstandardized coefficients

vi- Standardized Canonical Discriminant Function Coefficients

	Function	
	1	2
REGR factor score 1 for analysis 1	1.014	-.514
REGR factor score 2 for analysis 1	.732	.706
REGR factor score 3 for analysis 1	-1.865	-.232

vii- Functions at Group Centroids

	Function	
Student Group	1	2
1.00	-1.565	-.189
2.00	1.769	1.214
3.00	3.483	-1.693

Unstandardized canonical discriminant functions evaluated at group means

viii- Classification Results(a)

		Student Group	Predicted Group Membership			Total
			1.00	2.00	3.00	
Original	Count	1.00	77	6	0	83
		2.00	2	29	7	38
		3.00	0	3	15	18
	%	1.00	92.8	7.2	.0	100.0
		2.00	5.3	76.3	18.4	100.0
		3.00	.0	16.7	83.3	100.0

a 87.1% of original grouped cases correctly classified.

Conclusions

The main conclusions of this paper may be summarized in the following:

Factor analysis, using the principal component method and varimax rotation, reduced 15 explanatory variables selected to determine students' preferences for teaching strategies that strengthen the learning of economics to three factors; namely: (1) information and group participation (2) in-depth knowledge and application, and (3) assessment and evaluation

Multiple discriminant analysis suggests that:

i.. Students who start learning economics focus their great emphasis on methods of assessment, structure of subject outline and contents of textbooks.

ii.. Students who study intermediate economic theory, mathematical economics, econometrics and other quantitative economic techniques feel that they can benefit more in learning these subjects if they can receive more in-depth knowledge by having adequate prerequisites, using rich references, applying economic theory to interdisciplinary courses and concentrate more on application of quantitative techniques through use of computer labs

iii. students who study advanced economic theory, advanced quantitative economic techniques and applied economics believe that their learning of these subjects would improve if they can use benefit from information available on the internet, in lecturers' and decision maker's presentation. The discriminant analysis results also seem to suggest that students doing applied economic subjects are interested in having group participation in terms of group discussion, joint research and group presentation

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