SCHUMPETER'S "VISION" AND THE TEACHING OF PRINCIPLES OF ECONOMICS [*]

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(17 March 2008)

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Abstract

Sixty years ago, Schumpeter's Presidential Address to the American Economic Association discussed the "pre-scientific vision" underlying the research of individual economists. This paper argues that a similar concept can be applied to different students studying economics. Resource students at a New Zealand university, obliged to take an introductory principles course designed primarily for commerce students, experienced significantly poorer outcomes than their commerce counterparts. Inspired by Schumpeter's concept, a new course motivated the resource students to engage with the subject by paying careful attention to their concerns and interests. The result was a measurable improvement in the class's relative performance.

Keywords: economic instruction; resource students; film

JEL Codes: A2, A22

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In many small and medium sized universities, the Department of Economics offers a generic first-year course on principles of economics to students enrolled in programs across the whole campus, both inside and outside the commerce and business faculties. There are sound reasons for a generic course: the foundational principles of economics are the same in whatever context they come to be applied by students; there can be significant economies of scale in a single offering compared to providing a different course for every degree; and the economics education literature offers instructors well-researched techniques for engaging students with diverse learning styles (for example: Becker 1997, 2000; Becker and Watts 1995, 2001a, 2001b; Elzinga 2001; Hawtrey 2007; Jensen and Owen 2003; Lage *et al*. 2000; Siegfried *et al*. 1996; and Ziegert 2000). Nevertheless, Hawtrey (2007, p. 143) is surely correct to observe that 'students today are rarely satisfied with a one-size-fits-all classroom experience', and there may be deeper reasons why achieving good learning outcomes for students in a mixed class requires more than allowing for diverse learning styles. In particular, students from different programs may come to their study with different perceptions of economics *per se*. This possibility of differing "visions" among the student body needs to be taken into account if all groups of students studying principles of economics are to be successfully motivated to engage with the subject.

To cite a directly relevant example, consider Jill Caviglia-Harris's (2003) innovative approach to teaching economics in an interdisciplinary course on environmental perspectives. Most students in her class had not been exposed to economics previously, and indeed their perceptions of the subject were not always well-founded (Caviglia-Harris 2003, p. 200, emphasis added):

> The first-day survey demonstrated that the majority of the students did not understand economics and its role in environmental policy. Some students stated that economics was the *cause* of the environmental problems of today and believed that this is what environmental economists studied. For example, one student said that, "Economists convert nature into money and are one of the factors in the destruction of the environment."

Consequently, Caviglia-Harris designed her course to avoid more abstract presentations of economic theory in favor of using environment-based examples, in-class experiments, and economic games. Thus she was able to bring students to recognize the link between prices, markets, and environmental policy in a way that would have been much harder in a generic course designed primarily for business or commerce students.

This present paper arises from an award-winning innovation to improve learning outcomes for environment students enrolled in the introductory economics course at Lincoln University – one of New Zealand's seven universities, with specialist strengths in agriculture, the physical and biological sciences, commerce, the environment and social science.[1] ECON 101 is a principles course offered by the commerce division for all students, but dominated in number by students enrolled in commerce degrees. The university's environment, society and design division provides small but nationally important degree programs in environmental management, landscape architecture, resource

studies and tourism management, and a smaller degree program in social science. Prior to 2005, a student wishing to graduate with any of these five degrees was obliged to pass ECON 101. Figure 1 presents data showing that these students (labeled RES for resource students) had consistently poor learning outcomes in ECON 101 compared to the students enrolled in commerce programs (labeled COM). The top and bottom sets of data show respectively that from 2001 to 2004 the pass rates and the mean marks of the resource students were well below those of the commerce students. A nadir was reached in 2004, when the gap in the pass rates was 16 percentage points, accompanied by a 9 percentage point gap in the mean marks of the two groups.

– FIGURE 1 PLACED ABOUT HERE –

Consequently, the university's Academic Board approved the introduction of a new course, ECON 105, to replace ECON 101 as the compulsory subject for the above five programs from 2005. The new course was still to be taught by the commerce division and would cover a syllabus to allow progress to the next level of economics for those who achieved an unrestricted pass. Within those constraints, ECON 105 was designed to meet the specific learning needs of resource students studying economics for the first time. Figure 1 records the impact on their learning outcomes: the pass rates and mean marks of the resource students in ECON 105 were above those of the commerce students in ECON 101 for each of the next three years, 2005 to 2007.

This paper explains the innovation in the economic instruction of ECON 105 – and the theory behind the innovation – that led to this turnaround. The theory was based on Joseph Schumpeter's (1949) concept of "pre-scientific vision" that was the core of his justly

famous Presidential Address to the American Economic Association delivered 60 years ago (McGraw 2007, pp. 476–84). The paper begins with a discussion of that concept and how it is relevant for helping resource students to learn economic principles. The next section then describes the specific innovation introduced in ECON 105, which was built on the approach of Caviglia-Harris (2003) but departed from her recommended sequence of 'introductory economics material, economic theory specific to the field addressed, and applications related to the course theme' (p. 197). Instead, ECON 105 sought to engage with the *vision* of resource students by beginning with a relevant theme from environmental economics (the tragedy of the commons in ocean fisheries) as the vehicle for introducing students to the core economic principles involved in the operation of a competitive market. The paper finishes with a brief conclusion.

SCHUMPETER'S "VISION"

Schumpeter (1949, p. 350) observed that the process of scientific research begins with a pre-scientific act of perception and analysis, which recognizes a set of related phenomena as having some meaning or relevance that justifies the researcher's interest. This initial mixture of perceptions and pre-scientific analysis Schumpeter called the researcher's "vision". His address provided three historical illustrations. Adam Smith's attitude to the land-owning and to capitalist classes 'was the attitude of the observer from outside', whose 'sympathies went wholly to the laborer', and who felt disgust 'at the inefficiency of the English bureaucracy and at the corruption of politicians' (p. 353). Marx conceived history as 'the struggle between classes that are defined as the *haves* and the *havenots*, with exploitation of the one by the other, ever increasing wealth among ever fewer *haves* and

ever increasing misery and degradation among the *havenots*, moving with inexorable necessity toward spectacular explosion' (p. 354). Keynes perceived the modern economy as stagnationist, based on his vision of a 'mature and arteriosclerotic capitalist society that tries to save more than its declining opportunities for investment can absorb' (p. 355). Schumpeter suggested that the underlying visions of economist researchers are the source of unavoidable ideological bias (p. 352):

> [T]he original vision is ideology by nature and may contain any amount of delusions traceable to a man's [*sic*] social location, to the manner in which he wants to see himself or his class or group and the opponents of his own class or group. This should be extended even to peculiarities of his outlook that are related to his personal tastes and conditions and have no group connotation – there is even an ideology of the mathematical mind as well as an ideology of the mind that is allergic to mathematics.

Schumpeter was not worried by this ideology in the pre-scientific visions of economists. To the contrary, he argued that ideology is bound to wither over time, not only as a result of changing social patterns but also because scientific 'fact finding and analysis … tend to destroy whatever will not stand their tests' (p. 359). Nevertheless, if Schumpeter was correct to say that economic researchers come to their task with pre-scientific visions, it is also true that *students* of economics arrive with pre-scientific visions of the world and of the role of economics in understanding that world.[2] Certainly the distinction between a mathematical and non-mathematical mind made by Schumpeter in his last sentence above will be familiar to instructors of first-year principles courses.

There are significant differences between the vision of a typical commerce student and the vision of a typical resource student when each is studying economics for the first time.

The typical commerce student can be assumed to take for granted that the market system is a suitable mechanism for allocating resources and is likely to arrive in class with some curiosity about economic principles underlying the actions of consumers and producers in a market setting. In contrast, the typical resource student may hold suspicions about the impact of market-oriented business on the environment and may want to know how public authorities can intervene 'to save the planet'. These differences spill over into diverse visions for economics itself – commerce students are typically more favorably disposed to the study of economics as a way to advance their own ambitions, while Caviglia-Harris (2003, cited in the introduction above) is not alone in finding that some resource students may believe that economics is a cause of modern environmental problems.

Further evidence for these different visions can be found in Table 1. Soper and Walstad (1983) designed an instrument for measuring economic attitude sophistication (EAS) of economics students, comprised of 14 statements for which Soper and Walstad were able to demonstrate a strong consensus in the economics profession at the time of their study. The instrument asks students to indicate for each of the statements whether they strongly agree, agree, are undecided, disagree or strongly disagree with its proposition. These responses are coded 1, 2, 3, 4 and 5 respectively for the statements where the economics consensus position involves strong disagreement, or 5, 4, 3, 2 and 1 for those where the consensus position is the opposite.

– TABLE 1 PLACED ABOUT HERE –

This EAS instrument was administered to the commerce degree students in the ECON 101 class and to the resource degree students in the ECON 105 class, on the first day of

lectures at Lincoln University for the 2008 academic year.[3] Eleven incomplete forms were excluded from the analysis, leaving 105 valid responses from commerce students, and 41 valid responses from resource students. Table 1 reports the mean score and standard deviation for each question, analyzed by the two groups, as well as the Student t statistic for testing the difference between two means. The bottom row of the table reports the aggregate results, which show that overall the commerce students were closer to the economics consensus position than the resource students, and that the difference was significantly different from zero at the 1 per cent level. Further, the three individual questions where the significance was strongest were the three questions focusing on business: the resource students were significantly less likely to disagree that business makes too much profit and were also significantly less likely to object to the government regulating profits or controlling big business.

These results are consistent with the hypothesis that the resource students at Lincoln University enter the principles of economics course with a different vision about the way the world works, compared to commerce students. This can produce learning barriers for the former in a course designed primarily for the latter. Given a more passionate concern for issues such as about global climate change, environmental pollution, and resource depletion, resource students may not have the patience to attend several weeks of lectures on theories of market efficiency (following the standard textbook sequence) before the possibility of suboptimal social outcomes produced by externalities and common resources are addressed. This barrier is likely to be reinforced if resource students are predisposed to be suspicious of big business and the profit motive but the instructor's illustrations and case studies are generally drawn from commerce examples. The following section therefore

explains how the ECON 105 course introduced at Lincoln University was designed to improve learning outcomes by addressing these barriers.

THE DESIGN OF ECON 105

ECON 105 was required to cover a syllabus that allows progress to the next level of economics study for those who achieve an unrestricted pass. This means it shares many features with ECON 101. Assessment in both courses involves two term tests and a final exam with identical formats. Both courses use the same textbooks. Students in each course have access to a dedicated website where they can download PowerPoint lecture notes, practice tests and exams, and other ancillary learning resources. Instruction takes place over 12 weeks, with each week typically involving three or four hours of lectures and one hour of collaborative learning (small groups working on problem sets and case studies with assistance available from the instructor or tutor). Both courses devote their first week to similar introductory material.

The second week begins the study of competitive markets. Instead of following the ECON 101 example of going straight to the derivation of the supply and demand diagram, the ECON 105 class begins the week by watching a documentary on the depletion of ocean fisheries: *Empty Oceans, Empty Nets* (distributed by Video Education Australasia, Bendigo, Australia, 2002). Leet and Houser (2003) explain the power of a shared film or documentary in providing context for a class that is learning economics, which is exactly the role performed by *Empty Oceans, Empty Nets*. New Zealand is a small island nation in the South Pacific, and so management of ocean fisheries is an important issue for its resource students. Thus, the shared documentary is able to motivate students to engage with

the ECON 105 course by reassuring them that their concerns for the environment are being taken seriously and by promising that the market theory they are studying is directly relevant to those concerns.

After the documentary, I discuss with the class the stylized timeline of Hilborn and Walters (2001, Figure 1.1, p. 7), which shows that sustainable growth in an unregulated fishery is typically followed by sequential periods of over-exploitation, collapse and slow recovery. I explain to the class that we will develop an economic model to help answer four questions:

1. Why do fishing stocks get over-fished in an uncontrolled fishery?
2. Is this a case of market failure? Or will markets fix the problem themselves?
3. In either case, what is the best way for policymakers to help recovery?
4. What is best for people's well-being?

Having established a strongly relevant context, I continue with a standard textbook presentation of the theory of a competitive market. Students learn how the quantity supplied and the quantity demanded respond to a change in market price, and how each curve shifts as a result of other influences. I finish this segment of the course by returning to the ocean fishery case study, reminding students that the documentary had shown firms investing in specialist technologies to improve their ability to harvest a species (shifting the supply curve right) and marketing their product to increase consumption (shifting the demand curve right). I add a biological measure of maximum sustainable catch to the horizontal axis and the model is complete (see Figure 2). When a species is first commercialized, market equilibrium at E_0 is initially sustainable (that is, to the left of the maximum sustainable catch). As the development of new technologies shifts the supply

curve (S_0 to S_1), and as increased marketing shifts the demand curve (D_0 to D_1), both to the right, the market equilibrium shifts to E_1. The impact on market price is ambiguous, but the equilibrium quantity moves over time to the right, past the maximum sustainable catch, and the fishery may collapse.

– FIGURE 2 PLACED ABOUT HERE –

I then use Figure 2 to illustrate some of the policy responses students have seen in the documentary. If the authorities regulate boat owners to raise the cost of fishing, for example, or if they pay subsidies for reduced fishing effort, then the supply curve shifts to the left. If a public campaign by an environmental group encourages a consumer-led boycott of species being fished unsustainably, the demand curve shifts to the left. I end with the policy response that is universally adopted in New Zealand – the issuing of individual transferable quota permits, with a total allowable catch no greater than the maximum sustainable catch estimated by scientists (Lock and Leslie 2007). This restricts the supply to a vertical line representing the total allowable catch on the horizontal axis. I encourage the top students to work out that the price of quota in a competitive market must be the distance between where this vertical line intersects with the demand curve and the supply curve respectively. This is a very good example with which to finish the two week segment, since it involves students considering an important policy of using a *market solution* (establishing transferable property rights) to fix an important *market failure* (the tragedy of the commons).

Thus, by the end of their third week, the resource students in ECON 105 find they have come a long way. In contrast with the more abstract approach of ECON 101, they have

been exposed to material they can see is directly relevant to their interests.[4] A further advantage is that they have also been exposed to core principles of economics in a way that is inherently dynamic (since it is the shifting curves that explain the ocean fishery depletion and recovery). Finally, for some students the discovery that markets might be used to *fix* an environmental problem challenges their original vision of economics, exactly in line with Schumpeter's hopes for scientific progress.

The course continues to follow the textbook syllabus: elasticity of demand, consumer and producer surplus, competitive and monopolistic market structures, and so on. Following Caviglia-Harris's (2003) example, the abstract material is continuously reinforced with environment-based examples, especially in the cooperative learning sessions each week. Thus students learn through practice how they can apply the principles they are studying to important environmental policy problems such as choosing endangered species to conserve, reducing congestion in an open-access national park, granting a license to just one company in a local eco-tourism market, and analyzing the impact of a carbon tax to meet commitments under the Kyoto Protocol.

– TABLE 2 PLACED ABOUT HERE –

Table 2 provides an analysis of the change in the learning outcomes of the resource students relative to the commerce students for the three years before, and for the three years after, the introduction of ECON 105. The first measurable impact was on the percentage of resource student dropouts from the class, which almost halved from an average of 9.8% to 5.0% and moved from above the commerce dropout rate in each of the three earlier years to below the commerce dropout rate in the first three years of ECON 105. This contributed to

a marked improvement in failure rates, which fell from a peak of 38.9% in 2004 to between 22.4% and 28.3% in the first three years of ECON 105. Both results are consistent with the new course achieving better engagement by its weaker students. At the other end of the scale, the percentage of A+ students increased, from an average of 6.8% to an average of 10.2%. These impacts are reflected in the mean marks of the two groups. In each of the last three years that the resource students sat ECON 101, their mean was six or more marks below that of the commerce students, and this gap was statistically significant in 2003 and 2004. In all of the first three years following the introduction of the new course, the resource group achieved a higher mean mark in ECON 105 than the commerce group achieved in ECON 101 (although this positive difference was not statistically significant).

CONCLUSION

Siegfried *et al*. (1991, p. 213) has counseled that 'instructors need to find the most effective blend of abstract and contextual material to make the powerful ideas of economics accessible to all students.' Bartlett (1996, p. 150) has advised that in an introductory economics course 'student diversity should also be discovered and acknowledged positively on the first day.' More recently, Brewer and Jozefowicz (2006, p. 202) observe that students 'may become critical when they fail to perceive a direct relevance between course content and either their present life or intended career path [and that this] frustration tends to be most evident in required introductory level courses primarily taken by noneconomics majors.'

This paper has provided further evidence in support of these observations. Resource students at a small New Zealand university, obliged to take an introductory principles

course designed primarily for commerce students, experienced significantly poorer outcomes than their commerce counterparts (table 1 above). Inspired by Schumpeter's concept of "pre-scientific vision", a new course was designed to motivate the resource students to engage with the subject by paying careful attention to their concerns and interests. Thus the new course provided a strongly relevant context (the tragedy of the commons in ocean fisheries) for the students' study of how competitive markets operate, and the theory was immediately applied to show how a market solution might be used to address an example of market failure. That pattern was followed throughout the course, with abstract material constantly presented in an applied context and reinforced with environment-based examples. The result was a measurable improvement in the relative performance of the class (table 2).

ENDNOTES

[1] See Dalziel et al. (2007). The author responsible for the changes described in this paper received an Award for Excellence in Teaching in 2007, one of two Awards in this category conferred by Lincoln University that year.

[2] This statement and those in the following paragraph are based on the author's 25 years experience of teaching first-year economics in three different New Zealand universities. Some supporting evidence is offered in Table 1 below.

[3] Two small changes were made to the wording of the questions: 'gasoline' was replaced by 'petrol' in question 1; and 'Americans' was replaced by 'New Zealanders' in question 5. I also added a question asking if the student had previously studied economics; 61.0 per cent of the commerce degree students reported they had, compared to only 34.1 per cent of the resource degree students.

[4] Bartlett (1995, p. 364) has emphasised the importance of applying economic theory to economic problems related to student interests in order to attract bright students to economics.

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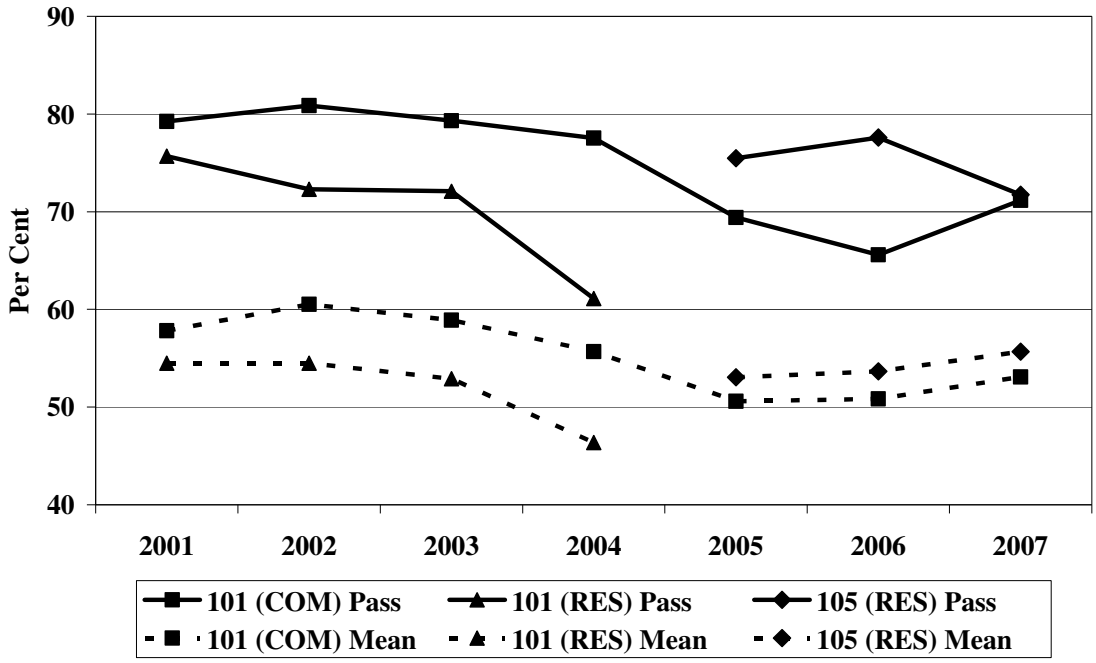

FIGURE 1. Pass rates and mean marks for commerce and resource students, 2001–2007.

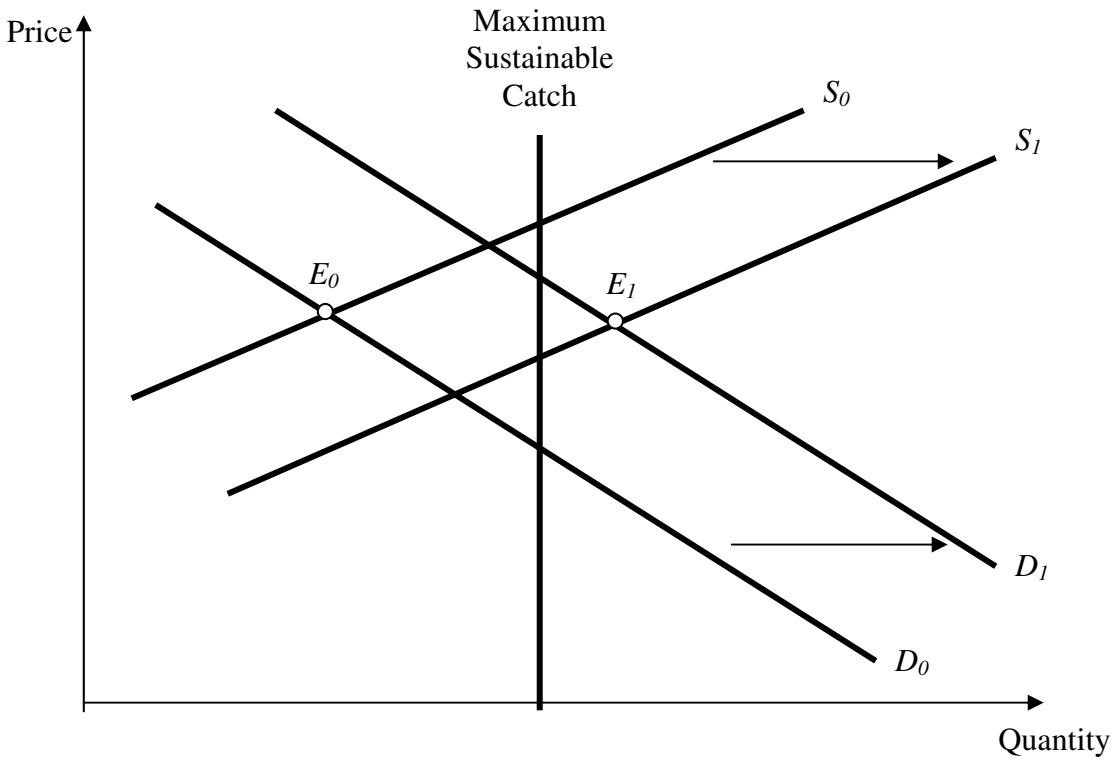

FIGURE 2. Supply and demand in an ocean fishery.

TABLE 1. Results of the Economic Attitude Sophistication survey

		Commerce (101)		Resource (105)		Student t
		Mean	S.D.	Mean	S.D.	Statistic
1.	Government should control the price of petrol.	2.77	1.06	2.61	1.09	0.81
2.	Inflation is caused by greedy business and union leaders.	3.21	0.86	2.98	0.72	1.66 *
3.	Business makes too much profit.	3.83	0.80	3.46	0.74	2.60 ***
4.	People should not have to pay taxes.	3.50	1.14	3.51	1.23	–0.08
5.	Free medical care should be provided for all New Zealanders.	2.28	1.12	2.24	1.14	0.15
6.	Banks should not charge interest on loans to customers.	3.53	1.18	3.15	1.04	1.92 *
7.	Most people who don't have jobs are too lazy to work.	2.81	1.19	3.17	1.12	–1.72 *
8.	When a business gets big, it should be controlled by government.	4.10	0.86	3.78	0.65	2.42 **
9.	New factories are not needed.	3.90	0.87	3.63	0.94	1.54
10.	People should not be told how to spend their money. *(Reverse coded)*	3.92	1.03	3.56	1.07	1.86 *
11.	If everyone had more money, we'd all be better off.	3.59	0.97	3.66	0.82	–0.43
12.	Profits should not be regulated by government. *(Reverse coded)*	3.55	0.96	3.07	0.82	3.02 ***
13.	Most unemployed people are lazy.	2.93	1.12	3.15	1.17	–1.00
14.	When a strike occurs, government should step in and settle the dispute.	2.83	0.99	2.71	0.84	0.74
	Aggregate Totals	3.34	0.45	3.14	0.32	3.22 ***

1 = strongly agree; 2 = agree; 3 = undecided; 4 = disagree; 5 = strongly disagree.
* Significant at the .10 level; ** Significant at the .05 level; *** Significant at the .01 level.

TABLE 2. Comparison of ECON 105 and ECON 101 results, 2002–2007.

	2002		2003		2004		2005		2006		2007	
	RES	**COM**	**RES**	**COM**	**RES**	**COM**	**RES**	**COM**	**RES**	**COM**	**RES**	**COM**
Class size	65	298	86	469	90	561	53	425	58	311	46	274
Dropouts	9.2%	6.0%	5.8%	4.9%	14.4%	4.3%	3.8%	7.1%	6.9%	8.4%	4.3%	10.9%
Failed	27.7%	19.1%	27.9%	20.7%	38.9%	22.5%	24.5%	30.6%	22.4%	34.4%	28.3%	28.8%
Unrestricted	67.7%	76.2%	57.0%	74.8%	57.8%	71.5%	60.4%	64.9%	67.2%	62.1%	63.0%	67.9%
A+ grade	12.3%	17.4%	4.7%	8.7%	3.3%	7.8%	7.5%	4.2%	12.1%	10.3%	10.9%	11.7%
Mean mark	54.5	60.5	52.9	58.9	46.4	55.7	53.1	50.6	53.7	50.8	55.7	53.1
Std. dev.	24.3	21.6	20.3	19.0	24.3	19.2	19.0	20.1	21.5	22.8	19.3	24.9
Difference	-6.0		-6.0		-9.3		2.5		2.8		2.6	
t statistic	-1.85		-2.54		-3.46		0.88		0.91		0.80	

Notes:
Class size is the number of students enrolled in the class at the end of the second week of the semester.
Dropouts is the percentage of the class who did not receive a grade because they did not sit the final exam.
Failed is the percentage of the class who did not gain credit for the course, including those who dropped out.
Unrestricted is the percentage of the class who were qualified to proceed to the next level of economics studies.
A+ grade is the percentage of the class who received a mark of 80 or above (out of 100).
Mean mark and Std. dev. are the average mark (out of 100) and its standard deviation as shown in Figure 1.
Difference is the mean mark for the resource students minus the mean mark for the commerce students.
t statistic indicates the significance of the difference between the two means, with a critical absolute value at the 5% level of 1.96.