Schumpeter's 'Vision' and the Teaching of Principles of Economics to Resource Students*

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Abstract

Sixty years ago, Schumpeter's Presidential Address to the American Economic Association discussed the 'vision' underlying the research of individual economists. A similar concept can be applied to different groups of students studying economics. Resource students, 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, and reflecting the wider movement for problem-based learning, 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.

JEL classification: A2, A22

1. Introduction

Students from diverse backgrounds come to tertiary studies with different learning needs and styles. In their influential study, Prosser and Trigwell (1999) identified that students whose prior education experiences have prepared them for 'deep learning' do better than students who have not been challenged to move beyond 'surface learning'. Students have different strengths in learning material presented in different ways, such as in visual diagrams, as written text, in spoken lectures or through practised examples (Fleming and Mills, 1992). There is evidence that students benefit from problem-based learning, especially when the problems are directly relevant to their interests (Zuber-Skerritt, 1993; Boud and Feletti, 1997; Bourner *et al.*, 2000; Forsythe, 2002; Savin-Baden and Major, 2004). The literature on economics education also provides a wide range of reflective thought on how to engage students with diverse learning styles; for example, Becker (2000, 2004), Becker and Watts (2001a, 2001b), Colander (2004), Denis (2009), Dynan and Cate (2009), Elzinga (2001), Flores and Savage (2007), Guest (2005), Guest and Vecchio (2003), Hawtrey (2007), Jensen and Owen (2003), Lage *et al*. (2000), Owen (2007) and Ziegert (2000).

This literature includes particular attention on the teaching of introductory economics courses to first-year tertiary students. The curriculum of these courses is very well-defined by a strong consensus in

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textbooks, with the powerful conceptual model of competitive market equilibrium at its core (Reimann, 2004). Students are required to learn how to present this model (either graphically or algebraically), how to apply the model to analyse events affecting supply or demand, and how the model is extended to consider imperfect competition, instances of market failure and theories of macroeconomic management. The dominance of this conceptual core in the economics curriculum has led some economists to worry that 'students who come to us to "study economics" instead become experts in mathematical manipulations' and 'their views on economic issues are influenced by the way we teach, perhaps without them even realising it' (Rubinstein, 2006, p. C1; see also Frey *et al.*, 1993, Frank *et al.*, 1996, Frey and Meier, 2003, Cipriani *et al.*, 2009, and Dow, 2009). This concern has particular force when the first-year course on principles of economics is offered to students across the whole campus, both inside and outside the commerce faculty.

In particular, the standard economics curriculum can pose learning challenges for students enrolled in programmes such as resource or environmental management. Students who enter these programmes because they are concerned about negative impacts of market behaviour on environmental or social outcomes are likely to struggle to engage with a course that begins with several week of studying conceptual theories of the benefits of competitive markets. If the examples used to illustrate these theories favour business applications, this is likely to create a further barrier to learning by such students. This issue is described by Jill Caviglia-Harris, who reported that the students in her inter-disciplinary course on environmental perspectives, most of whom had not been exposed to economics previously, held perceptions of the subject that were not always well-founded (Caviglia-Harris 2003, p. 200):

> 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.'

Caviglia-Harris responded by moving quickly through the core theory (and avoiding its more abstract features) to focus on applications using environment-based examples, in-class experiments and economic games. Thus she was able to help her students learn to recognise the link between prices, markets and environmental policy more effectively than would have been possible for this group of students in a typical principles course. Her article generalises from this experience to advocate a curriculum sequence of 'introductory economics material, economic theory specific to the field addressed, and applications related to the course theme' (Caviglia-Harris, 2003, p. 197).

This present paper argues for an approach that goes one step further, based on an award-winning innovation to improve learning outcomes for resource students enrolled in the introductory economics course at one of New Zealand's eight universities, Lincoln University.[1] Following a proposal made by Nicola Reimann (2004) in this journal, the extra step is not simply to *apply* economic theory to relevant examples, but to present the *theory* itself within a relevant problem-based context. In the Lincoln University example, the problem was explicitly chosen to fit the 'vision' of resource students for their role in addressing environmental issues.

The word 'vision' is taken from the Presidential Address given 60 years ago by Joseph Schumpeter (1949) to the American Economics Association, in which he argued that different scientists come to their research with different visions of the world and their place in it (see McGraw, 2007, pp. 476–84).

[1]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) and was awarded a Good Practice Publication Grant in 2008 from Ako Aotearoa, the National Centre for Tertiary Teaching Excellence, to produce a resource on the innovations described in this paper; see Dalziel (2009, 2010).

This paper argues in the following section that this is also true of students coming to the study of economics. The paper then continues with a description of a course designed to engage the vision of resource students by using a relevant theme from environmental economics (the tragedy of the commons in ocean fisheries) as the *means* for introducing students to the core economic principles involved in competitive markets. The paper finishes with some evidence of the benefits of the change for members of the class, followed by a concluding summary and discussion.

2. 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 recognises 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' (idem, 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' (idem, 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' (idem, p. 355). Schumpeter suggested that the underlying visions of economist researchers are the source of unavoidable ideological bias (1949, 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 the biases in these different visions. 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 different visions of the world and of the role of economists in understanding that world.[2] Certainly the distinction between a mathematical and a non-mathematical mind made by Schumpeter in his last sentence quoted above will be familiar to instructors of first-year principles courses.

Building on Schumpeter's concept, there are differences between the vision of a typical commerce student and that of a typical resource student in a first-year economics class. The typical commerce student can be assumed to be sympathetic about businesses operating in a market system and is likely to arrive in class with some curiosity about economic principles underlying the actions of consumers and producers. In contrast, the typical resource student may be suspicious 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 favourably disposed to the study of economics as a way to advance their own ambitions (and indeed is more likely to have studied economics previously), while Caviglia-Harris

[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.

(2003, cited above) is not alone in finding that some resource students may hold the prior belief that economics is a cause of modern environmental problems.

Further evidence for this difference can be found in Table 1. Soper and Walstad (1983) offer an instrument for measuring the economic attitude sophistication (EAS) of students, comprised of 14 statements for which Soper and Walstad could demonstrate a strong consensus in the economics profession at the time of their study. The instrument asks students to indicate for each statement whether they strongly agree, agree, are undecided, disagree or strongly disagree. 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 Results of the economic attitude sophistication survey

	Commerce (101)		Resources (105)		Student t-statistic	
	Mean	SD	Mean	SD		
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 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 0.10 level; ** Significant at the 0.05 level; ** Significant at the 0.01 level.

This EAS instrument was administered to commerce degree students and to resource degree students in the first economics lectures at Lincoln University in 2008.[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, analysed 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. This difference was significant at the 1% level. Further, the individual questions with the strongest significance were the three questions on business: the resource students were significantly less likely to disagree that business makes too much profit or to object to the government regulating profits or controlling big business.

[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% of the commerce degree students reported they had, compared to only 34.1% of the resource degree students.

These results are consistent with the hypothesis that resource students at Lincoln University enter the principles of economics course with a vision different to that of commerce students. As noted in the introduction, this can produce learning barriers for the former in a course primarily designed for the latter. Given a passionate concern for issues such as global climate change, environmental pollution and resource depletion, resource students have less 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 (Rubinstein, 2006). The following section therefore explains how a new course was designed to improve learning outcomes by addressing these barriers.

3. Teaching economics to resource students

Prior to 2005, Lincoln University students who were enrolled in degrees in environmental management, landscape architecture, resource studies, social science or tourism management were obliged to study a standard principles of economics course, ECON 101. These students had consistently poorer outcomes in ECON 101 than classmates from the University's commerce programmes in the same course. A nadir was reached in 2004, when their pass rate was 16 percentage points below that of the commerce students, accompanied by a 9 percentage point gap in mean marks. Consequently, a new course, ECON 105, was introduced to replace ECON 101 in the above five degrees. This new course was taught by the commerce faculty at the same level as ECON 101, but was intended to meet the specific learning needs of resource students studying economics for the first time.

ECON 105 shared many features with ECON 101. Assessment in both courses involved two term tests and a final exam with identical formats (although not the same questions). Both courses used the same textbooks. Students in each course had access to a dedicated website where they could download PowerPoint lecture notes (see Chen and Lin, 2008, for the benefits of this), practice tests and exams, and other ancillary learning resources. Instruction took place over 12 weeks, with each week 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). The major difference in learning design lay in the way that the market theory was presented in the two courses: ECON 101 continued to teach the model conceptually, reinforced with practical applications and exercises, while ECON 105 framed the initial presentation of the theory with a pressing real world problem familiar to students from their own environmental concerns.

After a week of similar introductory material, the ECON 101 class continued by studying the textbook derivation of the supply and demand market diagram. In contrast, ECON 105 began its second week with 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 in providing context for a class that is learning economics. This was exactly the role performed by Empty Oceans, Empty Nets; New Zealand is a small island nation in the South Pacific, and so management of fisheries is an important issue for its resource students. Thus, the shared documentary motivated students to engage with the ECON 105 course by reassuring them that their concerns for the environment would be taken seriously and by promising that the market theory being studied would be directly relevant to those concerns.

The screening was followed by a discussion of the stylised 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 (the key message of the documentary). This became the problem that framed the class's study of the economic model of competitive markets. In particular, a PowerPoint slide explained to the class that the module would develop an economic model to address 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?

The class explored these questions by learning how to derive and apply the economic model of a competitive market. They studied how the quantity supplied and the quantity demanded respond to a change in market price, and how each curve can shift as a result of other influences. A biological measure of maximum sustainable catch was added to the diagram's horizontal axis, and students were reminded 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). The result is shown in Figure 1. When a species is first commercialised, 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 1 Supply and demand in an ocean fishery

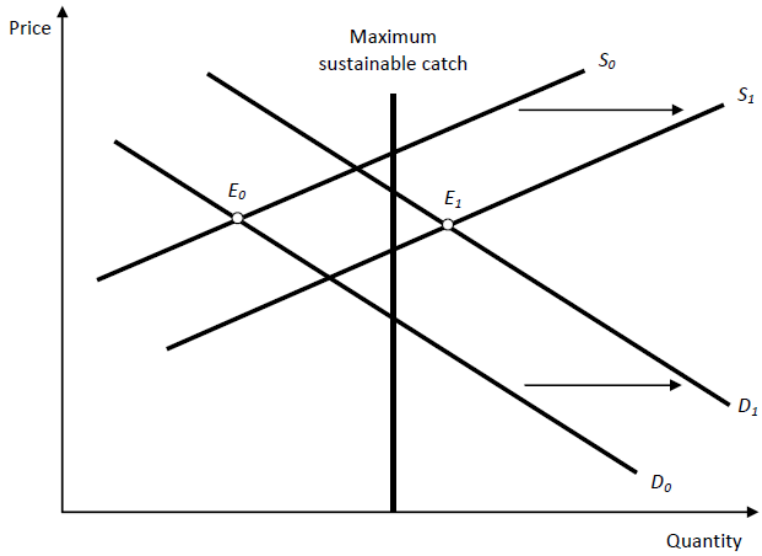

Figure 1 was used to illustrate policy responses shown in the documentary. If the authorities regulate boat owners to raise the cost of fishing, for example, or if they pay subsidies for reduced fishing effort, then the supply curve shifts to the left. If a public campaign by an environmental pressure group encourages a consumer-led boycott of species being fished unsustainably, the demand curve shifts to the left. The policy response adopted in New Zealand involves individual transferable quota permits being issued with a total allowable catch no greater than the maximum sustainable catch estimated by scientists (Lock and Leslie, 2007). This restricts supply to a vertical line representing the total allowable catch on the horizontal axis. This was a good example with which to finish the theoretical presentation, since it involved 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 found they had come a long way. In contrast with the more abstract approach of ECON 101, they have been exposed to material

they could see as directly relevant to their interests.[4] In particular, the problem-based approach was consistent with their vision as students wanting to address pressing environmental issues. A further advantage was that they had been exposed to core principles of economics in a way that was inherently dynamic (since it is the shifting curves that explain the ocean fishery depletion and recovery). Finally, for some resource students the discovery that markets might be used to fix an environmental problem challenged their negative vision of economics, exactly in line with Schumpeter's hopes for scientific progress.

Table 2 Comparison of ECON 105 and ECON 101 results, 2002–07

	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 as 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.

The course then followed the standard textbook syllabus elaborating on the market model: elasticity of demand, consumer and producer surplus, competitive and monopolistic market structures, market externalities, public goods and macroeconomic policy. This was closer to the material in the ECON 101 class, although with a stronger emphasis on cost-benefit analysis and, following the recommendation of Caviglia-Harris (2003), the abstract material was continuously reinforced with environment-based examples, especially in the cooperative learning sessions each week. Thus students learned to practise how to apply economic principles to important environmental policy problems such as choosing endangered species to conserve, reducing congestion in an open-access national park, granting a licence to just one company in a local eco-tourism market, and analysing the impact of a carbon tax to meet commitments under the Kyoto Protocol.

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

[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.

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).

4. Conclusion

Siegfried *et al*. (1991, p. 213) has counselled 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.' In this journal, Reimann (2004, p. 9) proposed as an observer from outside economics that 'the inductive, problem-first approach is interpreted as one possible way of aligning the teaching-learning environment with students, as it takes the importance of real-world examples and application of theory for student learning into account.'

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. Following Reimann's proposal and inspired by Schumpeter's concept of '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 the theory 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 within an applied, problem-based context and reinforced with environment-based examples. The result was a measurable improvement in the relative performance of the class (Table 2).

Some caveats are in order. The last empirical result was suggestive but not definitive. It is possible that the improvement came about from statistical chance, or was perhaps due to other associated impacts such as the smaller class sizes of the ECON 105 course or a higher than usual enthusiasm of a teacher and class involved in a deliberate pedagogical innovation (the Hawthorne effect; see Adair, 1984). It is possible that other heterogeneous features of the two groups (including their different levels of prior experience with economics; see footnote 3 above) may have played a role. In a future trial of this type, it would be useful to re-administer the Soper and Walstad (1983) survey to the two groups of students (commerce and non-commerce) at the end of their respective courses to test whether there had been any change in the significant differences found at the course start. Finally, the approach reported in this paper of offering a separate principles course to a small group of students is unlikely to be viable at many institutions (and indeed proved not to be sustainable at Lincoln University itself). This leaves open the important question of how to address the different visions of economics and the role of economists in a single first-year course.

Nevertheless, this course was designed within the more general movement in tertiary education that advocates problem-based learning. The Lincoln University experience suggests that such an approach is particularly important for students whose vision for their future is as problem-solvers equipped to address pressing global issues. It provides support for Reimann's (2004) proposal that the problem-first or inductive approach is a good way to align the teaching-learning environment with such students.

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