

Threshold Concepts: how can we recognise them?

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Abstract

A threshold concept is defined by Meyer and Land (2003) as possessing the following qualities: transformative, integrative, bounded, and probably irreversible. This concept provides a promising way of interpreting the learning demand presented by subjects and Meyer and Land have begun to apply the idea in analysing learning economics. It redefines the familiar idea of a 'powerful concept' in a social constructivist context, providing a penetrating tool for the analysis of the development of discipline specific learning. This paper examines some difficulties to be faced in the operationalisation of the idea of 'threshold concepts' in economics and, in so doing, begins to identify ways in which these problems might be overcome.

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Introduction

The search for concepts that play a binding role in the structure of a subject has been somewhat akin to the search for Eldorado. The promised treasure offers a hope of designing a curriculum such that all students can follow a similar path in the development of their subject understanding. The potential blockages in the path of growing understanding can be predicted and removed by focused teaching. This approach to curriculum design is well illustrated by the Master Curriculum Guide for Economics used in some schools in the United States. This guide identifies 21 concepts to be taught to students in secondary education, of which 6 (Scarcity, Opportunity Cost and Trade-offs, Productivity, Economic Systems, Economic Institutions and Incentives, Exchange, Money, and Interdependence are presented as 'fundamental economic concepts'). The process by which the fundamental nature of these concepts was identified is described at some length by Sumansky (1986). It is pithily summed up on the EcEdweb site by the statement that 'Prominent economists and educators worked together to develop a set of fundamental economic concepts that are appropriate for presentation at each of the various levels of pre-college education' (EcEdweb, 2003).

In contrast, phenomenography eschews the term 'fundamental concepts', preferring to search for ways in which students conceive particular phenomena. Phenomenographers do not have a bi-polar view in which students either understand a concept (such as opportunity cost) or not. Rather they seek to identify different ways in which students conceptualise a phenomenon. In the case of economics, phenomenographers claim to have identified critical differences between students' conceptions of price (Dahlgren, 1984). They achieve this outcome by posing a question to probe students' interpretation of their experience of price as a phenomenon (e.g. 'Why does the price a bun in the student canteen cost X?'). The advocates of each of these approaches present them as not only valuable for practice, but as inescapably valid knowledge.

This paper examines the case for believing 'threshold concepts' offer a more promising basis for curriculum design than 'fundamental concepts' or 'conceptual structures' and, if so, how these concepts might be identified. Section 1 briefly reviews some problems in using 'fundamental concepts' and insights from phenomenography in curriculum design. Section 2 outlines the meaning of 'threshold concept'. Section 3 reviews alternative approaches to the identification of threshold concepts and argues that an inductive approach should be adopted. Section 4 illustrates such an approach to the identification of threshold concepts in economics and the conclusions in Section 5 suggest some implications for curriculum design.

1 Problems with previous approaches to the identification of structural concepts in economics

This section provides a justification for interest in threshold concepts by identifying some difficulties with ‘fundamental concepts’ and phenomenography as bases for curriculum design in economics. There are two reasons for believing that the Master Curriculum Guide has not provided a definitive blueprint for the structure of the subject. First, there is a disagreement amongst ‘experts’ about which economic concepts are ‘fundamental’. Second, the intellectual basis for the search for fundamental concepts is provided by Bruner’s (1960, 1966) early work on curriculum design. It is therefore subject to the criticisms (e.g. Bruner and Haste, 1987) directed at this conception of intellectual development and the curriculum.

The approach to the identification of fundamental economic concepts adopted in the US by the Master Curriculum Guide conflates the development of students’ understanding with the conceptual structure of the subject. In summing up the process by which the Master Curriculum Guide was developed, Sumansky claims to have ‘ended up by identifying the core ideas in economics’ (1986, p.61). As a result, debate over ‘fundamental concepts’ in this context is synonymous with debate over the nature of economics. For example, critics of the Master Curriculum Guide (e.g. Helburn, 1986; Heilbroner, 1987) focus on the assumption that the boundaries of economics are defined by neo-classical economics. As an alternative to the views of neo-classical economists, Buchanan (1979, 1982) proposes that exchange is the fundamental economic concept. In the UK, Jeffreys’ (1985) claim to have demonstrated that opportunity cost, the margin and efficiency are the key concepts of economics is equally problematic. These concepts are indeed central to neo-classical economics and their emergence as such is described by Shackle (1967). However, Jeffreys’ claim that viewing economic thought as a Lakatosian ‘Scientific Research Programme’ leads inexorably to *this* representation of economics as a discipline is not accepted by heterodox economists (e.g. Brown, 1981; Cross, 1982; Dow, 1983). Even if the arguments of non-neo-classical economists are rejected, a problem remains. The concepts of scarcity, opportunity cost and the margin became identified as characteristic of the core of economics through debate within the discipline about its essential nature. It is possible that ideas that helped to distinguish one type of economics from another are less profound in distinguishing economic thought from the thought of other disciplines.

The second problem with ‘fundamental economic concepts’ as a basis for curriculum design is that they divorce understanding from experience of the world. Students already have some experience of economics before they study the subject. They have experience of making decisions as consumers, they have experience of prices and income and much more. In order to make sense of this experience they have developed economic ideas, however primitive and ill-informed. Therefore, the process of education consists in changing understanding from this initial conception to a more sophisticated conception that has been developed by the subject. It is far from self-evident that this requires teaching to begin with the theoretically most basic idea in the subject. Arguably, it makes

much more sense to begin with the phenomena within students' experience and with the ways in which they have interpreted that experience. In addition, a curriculum designed to track students through a logical sequence of the subject's structure runs into problems if the ultimate intention is to equip students to make sense of their experience in a way that reflects the insights of the subject. This problem was widely reported in the UK in the 1970s and 1980s (e.g. Lee, 1986; Levačić, 1987) and it led economics educators in the US to add an economic decision-making framework to the Master Curriculum Guide. The decision-making framework focuses on the evaluation of costs and benefits and is intended to help students to *apply* the concepts they have learned. Economics educators in the UK have tended to reject this attempted solution. Hodgkinson and Thomas (1984) suggest a decision-making framework as the core of economic thought, without any reference to 'applying concepts'. The authors of the Economics 16-19 Project (McCormick *et al.*, 1994) describe the approach of the Master Curriculum Guide as 'theory-first'. They advocate a reversal of this process such that students are asked first to analyse examples (or phenomena) in order to expose their current understanding.

Phenomenographers avoid the 'theory-application' problem by defining distinct conceptions in terms of relations between the mind of the individual and the world they experience. 'Conceptions are conceived as relational phenomena rather than as inherent qualities in the mind of the thinker or in the objects/ phenomena themselves' (Saljo, 1988, p44). The distinction between students' conceptions of price remains a frequently cited example of phenomenographic method. Students were asked to explain the price of a bun and their responses were recorded and transcribed. The transcripts were then read and re-read to generate categories which describe the conceptions. Typical questions which might be asked during this process are 'How does the respondent construe the phenomena?', 'What concepts does he or she use to explain it?', 'What types of similarities with other phenomena are introduced?' Through this analysis two main conceptions were identified. The first treats price as a 'the true value of the bun' and the second treats price as the outcome of supply and demand (Dahlgren, 1984).

Answers in category two are described as 'recognising the system dependency of price', whilst answers in category one are 'object-orientated' and 'commonly found in everyday situations'. The distinction between 'common sense' and 'the view of the discipline' is characterised in terms of a grasp of a system of relationships. Without access to the interview scripts on which these conclusions are based it is rather difficult to be sure what they mean. That is, previous (Piagetian) research (Thomas, 1985) has shown that young teenagers routinely conflate price and cost and, therefore, might be expected to respond to Dahlgren's question by treating the price of the bun as a self-evident characteristic reflecting its costs. However, a student who had been taught about the arguments for expecting 'sticky prices' in markets with stable competition might also reply to the question by saying that the price reflected the cost of production. Moreover, a student who accepted neoclassical analysis of markets and competition might respond that the price reflected the cost on the basis of an unstated assumption that the market was fully competitive. That is, the category of 'cost being equal to price' may roughly

correspond to three ways of thinking about price. As the researchers do not comment on this, and the original interview transcripts are not provided in the published research, it is difficult to judge how these distinctions might have been represented in students' talk or how they were interpreted in the researchers' process of classification. By using a category of description which treats price as determined by cost Dahlgren implies an internal structure which has a unique set of external relations (Marton, 1994), but this condition is violated where there are competing schools of thought. In these circumstances it is very difficult for researchers to avoid devising categories of description which are suggested by their own conception of the nature of a discipline given the dictum that individuals are unaware of the basis of their own perceptions. Although Pong (1997) does not regard this as a problem in relation to conceptions of price he does acknowledge the problem in relation to conceptions of trade. He identifies two conceptions of trade in students' transcripts. Conception one he terms 'an exchange of commodities' in which countries see mutual advantage in trading given absolute advantage. He refers to conception two as a 'zero-sum game' in which it is conceived that an advantage to one nation from trading must be at the expense of a disadvantage to another. The question in relation to conception two is whether the student fails to see the possibility of mutually advantageous trade or whether they believe that the terms of trade will be so stacked that mutually advantageous trade becomes not possible. Thus, whilst phenomenography avoids one problem faced by the economics concepts approach it has difficulties with the other. It may be that this problem arises because it explicitly defines conceptions as relations between individuals and the world as opposed to relations between subject communities and the world.

2 The meaning of 'threshold concepts'

Meyer and Land (2002) propose an alternative way of thinking about the development of the structure of a student's subject understanding. Their proposal consists in the identification of 'threshold concepts' which they suggest have five characteristics. First, they should be transformative, in that once acquired they should shift perception of the subject. Second, they should be irreversible. Once an individual has begun to perceive the world in terms of a threshold concept it should be inconceivable that they would return to viewing it in a more primitive way. Third, a threshold concept is integrative. Meyer and Land describe this as the capacity of a concept to expose the previously hidden interrelatedness of something. Fourth a threshold concept is bounded. That is, it helps to define the boundaries of a subject area. If a threshold concept is relinquished thinking begins to move outside or beyond the scope of the subject itself. Finally, it is potentially troublesome in the sense defined by Perkins (1999). That is, a threshold concept may be counter-intuitive. In grasping a threshold concept a student moves from common sense understanding to an understanding which may conflict with perceptions that have previously seemed self-evidently true.

For example, Adnett and Davies (2002) show how non-economists have tended to view parental quest for a 'good education' for their children as a simple zero-

sum game. 'If one child secures a place at a 'good school' it is necessarily at the expense of another'. An economist would anticipate some supply-side responses and peer effects within and beyond school which make the prediction of game outcomes far more difficult. An economist is working here with a concept of general equilibrium which is not a typical feature of educated common-sense. Ideas like this may be thought troublesome not only because their integrative nature makes them difficult to learn, but also because they make the world appear a more troublesome place in the sense that it is more complex and difficult to understand.

General equilibrium is a transformative concept because it changes the way an individual thinks about the consequences of economic events. Situations which had previously appeared to be zero-sum games no longer appear so and the outcomes of a decision can no longer be evaluated on the basis of immediate effects. The systemic effects have to be considered. The concept of general equilibrium is also irreversible and integrative. It is integrative because it provides a framework for thinking about economies as systems and this characteristic makes the concept irreversible. In fact, these first three characteristics seem mutually interdependent. It is because the concept is integrative that it is also transformative and irreversible. It is difficult to imagine how a concept could possess one of these characteristics without the others. General equilibrium also helps to define the boundaries of economics. Economists who reject the notion of 'closed system' general equilibrium as defined by neo-classical economists nevertheless recognise the inter-relatedness of markets. Moreover, versions of economics that reject neo-classical general equilibrium are defined at least in part as departures from that notion.

The integrative characteristic of the concept also makes it problematic. The original Brunerian 'fundamental concepts' purport to be self-contained. It is conceivable that a novice learner should be introduced to fundamental concepts at the outset of their study in order to acquire building blocks which will serve as foundations for their later understanding. A threshold concept is conceived in a quite different way. From the point of view of the expert it is an idea which gives shape and structure to the subject, but it is inaccessible to the novice. In fact, it may be counter-intuitive nature and off-putting. It can appear to be a denial of the world which the student experiences and therefore may lead to the student rejecting the subject as 'abstract' and 'meaningless' (Levačić, 1987). Before a student can grasp a threshold subject they must first acquire pieces of knowledge and understanding which can later be integrated. The power and value of the threshold concept can only be recognised by a student if they can see how it is able to act in an integrative way.

There are two sources of trouble here for the teacher. First, if a threshold concept is introduced too early it is inaccessible to the student and it can only be learnt in a rote fashion which emphasises its lack of real meaning to the student. Second, once a student has acquired sufficient knowledge and understanding to make it possible for the concept to play an integrative role, the teacher has to help

students to re-interpret their current ideas in the light of the threshold concept. This is a major undertaking and if it fails, the student fails to truly ‘get inside’ the subject. In either case the teacher and the student may settle for the appearance of understanding which is all that can be achieved if the threshold concept is not acquired.

3 How threshold concepts can be identified

Each conception of the structure of a subject entails a particular approach to the practice of identifying that structure. The ‘fundamental concepts’ of the Master Curriculum Guide were identified through ‘prominent economists and educators working together’. That is, they were identified through professional reflection on the nature of the subject as a conceptual entity. The phenomenographic distinctions between conceptions of price were identified by posing a question about a phenomenon within students’ experience and inductively discriminating between the underlying conceptions revealed in students’ answers. If either of these methods were to be adopted in an attempt to discover ‘threshold concepts’ then the predictable outcome would be a replication of either the Master Curriculum Guide or the findings of phenomenographers.

For example, Meyer and Land (2002) quote at length from Shanahan who suggests that opportunity cost is an example of a threshold concept. The argument may be paraphrased thus: opportunity cost is intrinsic to economists’ definition of choice; this can be verified by reference to a standard work on the nature of economics; therefore a student who has grasped the concept of opportunity cost has acquired a transforming perspective of the discipline. This is precisely the same process as the one referred to by Sumansky in describing how ‘fundamental concepts’ were identified for the Master Curriculum Guide. It is not surprising, therefore, that opportunity cost – which is identified in the Master Curriculum Guide as a fundamental concept – should also be identified through this process as a threshold concept. This process asks economists and economics educators to state how they present the nature of the subject to themselves and each other. From a social constructivist perspective it is pertinent to ask ‘how did this representation of the subject develop?’ If the representation developed through a process in which competing views of the subject struggled to assert their dominance then the purpose in the genesis of the idea does not require that it is subsequently viewed as a transformative or integrative concept. That it may come to be viewed in that way may simply reflect how members of a community represent the discipline rather than how they analyse phenomena as members of that community.

The approach of phenomenographers to the identification of different ways of conceiving phenomena treats these distinctions as the outcome of the interaction of individuals with the world. If we replace this conception with the idea that different conceptions are the result of interactions between subject communities and experience of phenomena then a different way of thinking about conceptual differences emerges. If a critical realist perspective is adopted then the different

ways of conceiving a phenomenon reflect characteristics of the phenomenon itself *and* characteristics of the social construction of that phenomenon. Constructions of the phenomenon by any individual are dependent on their access to the social constructions that have been developed over time by communities of thought. In fact this way of thinking is consistent with the type of differences in scientific conceptualising that phenomenographers observe. For example, they (Marton, 1988, Bowden *et al.*, 1990) contrast Aristotelian and Newtonian conceptions of force. Different ideas about force are not randomly distributed across individuals and over time. What are the implications of this way of thinking about differences in conceptualisation for a search for threshold concepts?

First, we may discover the distinctive way in which one community of scholars thinks about a phenomenon best by comparing their analysis with the analysis of a different group of scholars. Second, if we are to seek threshold concepts in the utterances of students we need to take explicit account of the way in which communities of thought categorise phenomena. That is, any question such as ‘Why is the price of a bun X pence?’ is not independent of the way constructions of phenomena have been socially developed. If the development of a discipline of thought (such as economics) is such that there are competing conceptions of different phenomena then it makes sense to word questions in ways that are more likely to expose understanding of these different conceptions as well as differences between ‘common sense’ conceptions and conceptions that are informed by the discipline. In the case of price the question ‘Why has the price of bun changed?’ is more likely to serve this purpose than ‘Why is the price of a bun X pence?’ The place where questions informed by the discipline are most naturally framed is in the classroom or seminar. Although we might reasonably suppose that students may give a different answer if posed a similar question in the context of their education or their everyday life, the kind of question should be informed by what scholars believe should be taught. This approach should avoid the problem of ‘fundamental concepts’ (taking insufficient account of students’ experience) and the problem facing the phenomenographers (taking insufficient account of the interaction between community of scholars and experience).

4 Identifying threshold concepts in economics

This section illustrates how an analysis of academic writing in disciplines can be combined with analysis of work carried out by students in lessons to identify threshold concepts in economics. The first part of the section examines the way in which sociologists and economists have analysed the impact of marketisation in education. The second part of the section examines evidence of students’ thinking about recycling as revealed through tasks undertaken in a lesson in school. These examples suggest that ‘common-sense’ thinking about economic relationships treats them as ‘zero-sum games’ and that this thinking is preserved in the frameworks of analysis used by sociologists in the analysis of markets in education. This does not imply that economic analysis of markets in education is superior to that of sociologists. A similar analysis could be undertaken to show that illuminative ways of thinking developed by sociologists are routinely

overlooked by economics when analysing education. Two extracts from papers by Adnett and Davies (1999, 2002) provide exemplification.

‘Most recent (sociological) studies have paid attention to the relationship between choice making and social class and how availability and accessibility constrain choice. Gewirtz *et al.* (1995) reach a typical conclusion in their study of three local schooling markets: ‘choice is very directly and powerfully related to social class difference...choice emerges as a major new factor in maintaining and indeed reinforcing social-class divisions and inequalities’ (p.55). Glatter and Woods (1994), Echols and Willms (1995) and Reay and Ball (1997) amongst others discovered that social class affected the pattern of preferences, as well as the exercise of choice itself. Together these findings support Ball’s (1993) proposition that their greater social and cultural capital enables the middle classes to exploit the quasi-market to reproduce social and economic inequalities.

The existing literature has established that parental educational attainment, child-care provision and transportation costs are important factors in explaining these differences. These factors, together with the ability to read and decode signals and ‘work the system’, have dominated much of the debate identified above. However, notwithstanding the application of Rational Action Theory (Hatcher, 1998), the economic perspective suggests the need for a more systematic study of the ways in which labour and schooling markets affect the costs and, especially, benefits to different groups of making schooling decisions. For instance, Pratten *et al.* (1997) have argued that in the absence of cheap and appropriate signals from the labour market, parents and children are more likely to exhibit peer group and role-model behaviour. The structure of incentives and the nature of the signals provided in a schooling quasi-market will directly influence the relative importance of the social and individual determinants of decision makers’ behaviour.’ (Adnett and Davies, 1999, p. 228)

This extract describes the difference between sociologists who have viewed choice as a social phenomenon (and therefore a function of the past) and economists who view choice as an individual phenomenon (and therefore a function of currently perceived incentives). Two underlying ideas underpin this difference. For sociologists the decision-making process is one in which social differences are sustained. For economists the decision-making process is one in which new differences are created through individual responses to incentives. This difference draws upon the distinction between positional and non-positional goods.

‘Previous debates concerning the impact of parental behaviour in schooling markets have included a discussion of the

consequences of education being viewed as a positional good (e.g. Bowe et al., 1994, Jonathan, 1990, Ranson, 1993, Tooley 1995). It has been argued that a characteristic of pure positional goods is that the total level of welfare or benefits to be derived from such goods in a market is fixed. Hence, an increase in the benefits from 'consumption' for one individual is entirely at the expense of benefits to others. This is claimed to follow if parents are concerned only with the educational attainment of their children relative to other children in the cohort, rather than with the child's absolute level of attainment. An underlying rationale for such behaviour has been provided via fixed hierarchies of employment opportunities with jobs and social status determined by educational attainment and sustained across generations by the distribution of cultural capital. While Hollis (1982) and Jones and Hatcher (1994) argued for the existence of a fixed hierarchy of employment opportunities, Bourdieu and Passeron's (1977) analysis of cultural capital's role in perpetuating a hierarchy of social standing has formed a crucial part of many sociological analyses of educational decision-making (e.g. Ball *et al.*, 1996)...Frank argues that 'prisoner's dilemma' effects in combination with the prevailing frame of reference cause 'wasteful' competition to persist over time. In contrast, Congleton (1989) recognises that the social desirability of status competition depends crucially upon the net size of externalities or spillover effects generated. Transferring Congleton's argument to the schooling market, what matters overall is whether those demanding highly-ranked education for their children have the effect of raising or lowering the general quality of education in society. There are both consumption and investment externalities to be examined: one individual's consumption and investment in schooling affects the consumption and investment returns available to other individuals. For example, the inclusion of a disruptive child in a class may affect the level of education of their peers. However, contrary to the arguments of Jonathan and Ranson, such externalities are not inevitably negative. For example, one parent's decision to invest in more schooling eventually increases the supply of educated workers and raises the probability that an employer can fill a vacancy for a 'good' job. As a consequence more good jobs are created. As Snower (1996) has argued, national differences in the exploitation of such trading externalities can account for observed differences in the proportion of 'good jobs' in an economy's labour market.'

(Adnett and Davies, 2002, p. 190, 1994)

This passage is cited to show how non-economists tend to view economic relationships as zero-sum games such that goods are entirely positional. Economic arguments encourage recognition of non-positionality. When both perspectives are recognised the status of 'partially positional goods' can be expounded.

I now turn to an example of students' thinking. Classes of 14 and 15 year-old students in two schools were presented with a number of statements (Figure 1). They were asked to choose one statement they agreed with and one statement they disagreed with. In each case they were asked to give their reasoning in support of their viewpoint. This example is chosen here because agreement or disagreement with the statements in Figure 1 suggests a stance in relation to economic thinking whilst not presupposing neo-classical economics. For example, the statement 'recycling is good for the environment' is clearly too strong for either neo-classical or heterodox economics whilst the statement 'recycling can be bad for the environment' supported by reasoning either from neo-classical or heterodox economics.

Figure 1: Viewpoints presented to a class of 14 and 15 year-old students

| |
|---|
| 1 Recycling is good for the environment |
| 2 Business would not recycle if they were not forced to by government regulations |
| 3 Recycling can be bad for the environment |
| 4 Businesses and consumers want different things. Consumers want recycling and businesses do not. |
| 5 Businesses make more profit when they do not recycle. |
| 6 Businesses and consumers want the same things: better products at lower cost. |
| 7 Businesses do what consumers want them to do. |
| 8 Consumers face a choice between having a better environment or more and better products. |

A large majority of students selected 'recycling is good for the environment' as the statement with which they chose to express agreement. Typical examples of reasoning for this acceptance were 'I agree with this because if people recycled there would be fewer landfills and *it would save money*' and 'Because you are recycling waste and *you can use it again*'. These students regard recycling as necessarily a net resource gain. They do so because they do not consider that resources might be used in the process of recycling. This leaves these students with a problem in explaining business behaviour. This was most obvious in the case of those students who chose to express disagreement with the statement 'Businesses make much more profit when they don't recycle.' One student wrote 'I disagree because if they don't recycle then they have to buy more and more e.g. paper which makes more and more rubbish'. It was also apparent in the reasoning of students who disagreed with the statement 'Consumers face a choice between having a better environment or more and better products'. One student argued against this statement on the basis that 'recycling can work out cheaper and products made from recycled materials can be just as good as products made from

new materials.’ If recycling does not use resources and it saves money, why is recycling not a ubiquitous response of business? There was no real evidence that students recognised that there was a problem in the logic in their reasoning, especially as they regarded businesses as motivated purely by selfish motives. This was expressed clearly by students who chose to express a disagreement with the statement ‘Businesses and consumers want the same thing: better products and lower prices’. Typical reasons for disagreeing with this statement were ‘Businesses are greedy and want to make as much profit to pay off their financial problems e.g. wages, running costs and raw material costs’.

There are two related *integrating* perceptions that underpin the reasoning of these students. First, they describe the relationship between businesses and consumers *only* as a zero-sum game. They believe that businesses can only benefit at the expense of consumers. Second, they take a very *partial* view of the costs and benefits of production. In this case, they fail to take into account the costs of the resources used in the recycling process. Even those few students who declared agreement with the statement that ‘recycling can be bad for the environment’ supported their judgement with reasons such as ‘because when plastic is melted fumes are let off.’ These two perceptions are related because it is the partial view that leads students to believe that the relationships are *only ever* a zero-sum game. If students recognised that the impact of incentives upon subsequent cycles of behaviour they would see that the relationships are not necessarily a zero-sum game.

Evidence that regarding economic interactions as a ‘zero-sum game’ is an integrating aspect of ‘common-sense understanding’ is provided by a comparison of this evidence of thinking about recycling and Pong’s (1997) evidence of students’ thinking about trade.

Student I guess it (the free trade deal) has good points and bad points. Industries employ people in Canada. Now they can sell products in the United States without having to pay tax. So it helps our economy to grow. But then the United States can sell stuff here. That would reduce our economy because we have to buy their stuff. It somehow balances out. We can only gain if we can get other countries to buy more of our products than we are buying their products...

Interviewer I see. People who are for the free trade deal argue it would result in both trading partners gaining. It is a win-win situation. Do you think that is true?

Student From what I know about it I guess it can’t really be...If I am right that only one country gains, then one country has to be wrong (in believing they could gain).’(from Pong, 1997, p. 8)

From these examples we may infer that there is a case for regarding the idea that economic relationships are not necessarily a zero-sum game as an integrating threshold concept in economics. The examples suggest that this idea is not found in common-sense reasoning about a variety of economic phenomena or in the sophisticated reasoning of other disciplines. The examples show how a comparison of the way that disciplines analyse phenomena and an analysis of the

way in which students think about problems defined by a discipline can be fruitful in revealing the idea that truly integrate thinking in a subject.

5 Conclusions

The idea of a threshold concept as advanced by Meyer and Land is useful for a number of reasons. First, it offers a theoretical construct that enables the results of phenomenographic studies to be reinterpreted from the perspective of the social construction of disciplines. This is particularly helpful in those disciplines such as economics where fundamental disputes remain despite the existence of a well-established mainstream. Second, it offers a theoretical explanation of the problems that students face in developing their understanding of a subject and this provides a basis for the development of diagnostic tools and curriculum design. Third, it provides a link between approaches (deep or surface) to learning and the outcomes of learning. That is, students have an incentive to adopt surface approaches to learning when teaching is progressing on the incorrect assumption that students have understood a threshold concept. In the absence of this understanding students can only resort to learning surface routines and language in the hope that they can pass this off as real understanding. For these reasons threshold concepts may be more useful for curriculum design and the planning of teaching than either the 'fundamental concepts' approach adopted by the Master Curriculum guide or a phenomenographic approach that does not treat ideas ways of perceiving phenomena as explicit constructions of social traditions as embodied in disciplines.

If threshold concepts are distinct from either of these traditions then it makes sense to think that they must be identified in rather different ways. If a group of experts are asked to identify a threshold concept they are likely to identify concepts that have previously been identified as 'fundamental concepts' in their discipline. This follows (a) because this is how 'fundamental concepts' were identified in the first place and (b) because previous efforts to identify fundamental concepts have become embodied in the teaching traditions of the discipline. An attempt to identify a threshold concept through questioning an individual about a phenomenon they have experienced may not identify a threshold concept if the definition of the phenomenon is ambiguous with respect to ways of thinking developed through the discipline. Given the importance of 'integration' to the threshold concept it is also important to examine the degree to which a threshold concept is evident in students' thinking about different phenomena. This paper shows how 'economic relationships are not always a zero-sum game' can be identified as a threshold concept through a comparison of the reasoning employed by economists and sociologists and through a review of students' thinking about recycling and trade.

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Appendix 1 Key Concepts from the Master curriculum Guide

Kindergarten Key Economic Concepts

Scarcity- The condition of not being able to have all the goods and services that we want.

Choice- What someone must make when faced with two or more alternative uses for a resource, also called an *economic choice*.

Goods- Objects that can be held or touched that can satisfy people's wants.

Services- Activities that can satisfy people's wants.

For OPS:

K04: Identify how families and communities work together to meet their basic needs and wants. (Knowledge)

First Grade Key Economic Concepts

* **Review of Kindergarten Concepts**

Opportunity Cost -The next best alternative that must be given up when a choice is made. Not all alternatives, just the next best choice.

Resources-All natural, human and human-made aids to the production of goods and services. Also called productive resources.

Natural Resources-"Gifts of nature" that are present without human intervention (also called land).

Human Resources-The quantity and quality of human effort directed toward producing goods and services (also called labor).

Capital Resources-Goods made by people and used to produce other goods and services (also called intermediate goods).

Barter-The direct trading of goods and services between people without the use of money.

For OPS:

105- Describe how the basic process of choice making allows people to satisfy their basic needs and wants. (Comprehension)

106-Recognize characteristics of urban and rural communities depending on their resources. (Knowledge)

Second Grade Key Economic Concepts

*** Review of concepts from Kindergarten and First grade**

Interdependence- Dependence on others for goods and services; occurs as a result of specialization.

Money- A medium of exchange, a good that can be used to buy other goods and services.

Production/Producers- People who use resources to make goods and services, also called workers.

Consumers-People whose wants are satisfied by using goods and services.

Specialization- The situation in which people produce a narrower range of goods and services than they consume.

For OPS:

207 Identify natural, human, and capital resources (Knowledge)/TD>

208 Give examples of how to conserve or spend resources. (Application)

Third Grade Key Economic Concepts

*** Review of Kindergarten, First, and Second Grade Concepts**

Division of Labor -The process whereby workers perform only a single task or very few steps of a major production task, as when working on a assembly line.

Productivity - The ratio of output (goods and services) produced per unit of input (productive resources) over a period of time.

Markets-Any setting where buyers and sellers exchange goods, services, resources, and currencies.

Price- The value of a good or service stated in money terms.

Public Goods - Goods and services that are provides by the

government. They often too expensive or not practical to be obtained by individuals.

For OPS:

307 Describe how producers and consumers in the Omaha community are interdependent. (Comprehension)

308 Give examples of local businesses and name the products and/or services they provide. (Comprehension)

At this point, you may continue on in this document for economic concepts for the intermediate grades, or go to the [summary table of economics concepts](#) or to the [evidence of learning for primary grades](#).

For the Intermediate Grades

Fourth Grade Key Economic Concepts

*** Review of all the Primary Concepts**

Economic Systems -The way a society organizes the production, consumption, and distribution of goods and services.

Market Economy -An economic system where most goods and services are exchanged through private transactions by private households and businesses. Prices are determined by buyers and sellers making exchanges in private markets.

Circular flow - A model of an economy showing the interactions between households and business firms as they exchange goods and services and resources in markets.

Trade/Exchange - Trading goods and services with people for other goods and services or for money. When people exchange voluntarily, they expect to be better off as a result.

For OPS:

408 - Compare and contrast how resources have influenced the development of economic systems in various word regions. (Analysis)

Fifth Grade Key Economic Concepts

*** Review of Fourth Grade Concepts**

Factors of Production - Resources used by businesses to produce goods and services.

Investment in Capital Resources - Business purchases of new plant and equipment.

Investment in Human Resources - Activities that increase the skills and knowledge of workers.

Trade-offs - Giving up one thing to get some of another.

Demand - A schedule of how much consumers are willing and able to buy at all possible prices during some time period.

Supply - A schedule of how much producers are willing and able to produce and sell at all possible prices during some time period.

Equilibrium Price - The market clearing price at which the quantity demanded by buyers equals the quantity supplied by sellers.

For OPS:

507 - Compare and contrast how resources have influenced the development of economic systems in the United States. (Analysis)

Sixth Grade Key Economic Concepts

*** Review of all Primary and Intermediate Concepts**

Competition - Techniques used by businesses to gain more customers and to earn higher profits.

Costs of Production - All resources used in producing goods and services, for which owners receive payment.

Profit - The difference between the total revenue and total cost of a business; entrepreneurial income.

Entrepreneurship - The human resource that assumes the risk of organizing other productive resources to produce goods and services.

Incentives - Factors that motivate and influence the behavior of households and businesses. Prices, profits, and losses act as incentives for participants to take action in a market economy.

Taxes - Required payments of money made to governments by households and business firms.

Income Taxes - Taxes paid by households and business firms on the income they receive.

Property Taxes - Taxes paid by households and businesses on land and buildings.

Sales Taxes - Taxes paid on the goods and services people buy.

Unemployment - The situation in which people are willing and able to work at current wages but do not have jobs.

Shortages- The situation resulting when the quantity demanded exceeds the quantity supplied of a good, service, or resource.

Surpluses -The situation resulting when the quantity supplied exceeds the quantity demanded of a good, service, or resource, usually because the price is for some reason above the equilibrium price in the market.

For OPS:

610 Explain how economic decisions in one region affect other regions.
(Analysis)

611 Use economic concepts and current developments and issues in local, national, or global contexts. (Application)

Available at <http://ecedweb.unomaha.edu/K6goals.htm>