

Transforming the Economics Curriculum by Integrating Threshold Concepts

Abstract

Purpose

Economics is catering to a diverse student cohort. This cohort needs to be equipped with transformative concepts that students can integrate beyond university. When a curriculum is content-driven, threshold concepts are a useful tool in guiding curriculum re-design.

Approach

The evidence for this pedagogic need can be seen in the UK's higher education economics curriculum framework which is formulated around the threshold concepts of economics.

Methodology

Through a literature review of the application of threshold concepts in economics, the researcher has systematically re-designed an entry-level economics course. This research has been applied to the course structure, the learning and teaching activities, as well as the assessments.

Design

At the end of the semester, students were given a survey, a 'Learner Experience of Unit' (LEU), which included questions on the student experience of the curriculum design and the learning activities.

Findings

This LEU had at least a 40% response rate per semester. When comparing the survey responses to the previous semesters, there is a significant improvement in student experience of the course curriculum.

Practical Implications

This research provides curriculum developers with a benchmark and the tools required to transform economics curricula.

Social Implications

An engaging, transformative and integrative entry-level economics course is often the only exposure most graduates have to the economics way of thinking and practice.

Originality

This is the first comprehensive study that applies a curriculum re-sequencing based on threshold concepts across an entry-level economics course.

Keywords

Threshold concepts

Curriculum design

Learning and teaching

Higher education

Economics

Introduction

The higher education sector is undergoing a transformation. It is now seeing the entry of students from a wider educational background than ever before, (Gale & Parker, 2013). Furthermore, these students are entering a wide array of disciplines. Due to this heterogeneity of students in higher education, it is common that some students fail to grasp certain parts of their respective curriculum (Meyer & Land, 2006), whereas at the same time, other students are able to grasp these very parts without difficulty. Thus, there is a need for higher education providers to consider the pedagogical strategies to account for this divergence in student background and comprehension. Furthermore, higher education providers, through their faculties and departments, need to consider the course design that would assist a heterogeneous student cohort. Teachers need to consider what ideas are troublesome for some learners, as well as consider how to make this knowledge less troublesome to these learners (Land *et. al.*, 2005)

One learning issue across disciplines is equipping students to apply discipline-specific knowledge. While students may acquire the discipline's formal knowledge, students may be unable to apply

this knowledge. Without attaining the discipline's threshold concepts, learners could be left in a limbo state of understanding (Dyer, 2012). They could be in a limbo state due to the fact that they possess discipline-specific knowledge and content, but, they are unable to either utilise this knowledge in a transformative way, or utilise this knowledge in an integrative way (Meyer & Land, 2006).

Given the current state of higher education discussed above, one outcome could be that students could graduate from a course or even a degree programs with little, or a very superficial understanding of the required disciplinary concepts (Ward & Meyer, 2010). Furthermore, in some instances, while the student may grasp the required concepts, the student may not have acquired these concepts with a deeper level of understanding. According to Perkins (2006), the student is unable to grasp the “underlying game”, in other words, the student is unable to grasp a threshold conception.

Thus, attention to the threshold concepts of a discipline could be the benchmarking criteria for the development of curricula, the strategising of teaching, the assessment and achievement of learning outcomes, as well as the development of graduate capabilities.

Higher Education in Economics

The discipline of economics, like other disciplines is now catering to an ever-diversifying student cohort each decade (Cheah, Stokes & Wilson, 1999). Economics graduates will also face a world with career and business opportunities that did not in fact exist during their time in university, (Gale & Parker, 2013). Thus, it is important for graduates to have developed the essential skills needed to interact with diverse colleagues, as well as a diverse career landscape. Economics graduates have the potential to find that the content gained from their university education is either redundant or irrelevant in a dynamic world. Thus, economics graduates need to be equipped with concepts that have transformed their way of thinking. With these concepts in hand, graduates can then integrate these transferrable skills into their careers.

Thus, a transformation of economics curricula is needed to cater for the transformation of the student cohort, as well as to cater for the students' integration into a transforming world. There is a need for the economics curriculum to engage specific pedagogical practices that deliver the intended learning outcomes and the desired graduate capabilities. To transform a student, student engagement must be integrated into the economic curriculum. Via the integration of student engagement, these opportunities transform the student learning experience. In essence,

the economics curriculum needs to be transformed from a content-based curriculum to a threshold concept-based curriculum.

Of pedagogical concern, is that researchers such as Becker (2000) have reported that the field of economics has placed little value on the importance of teaching in recent decades. Furthermore, as Becker (2000) notes, the issue is serious because often, one or a couple of undergraduate courses in economics is usually the only exposure of the economics profession that undergraduate students have. Despite the report of Becker (2000), economics curricula have been proven to be homogeneous across both institutions as well as over time (Alauddin and Valadkhani, 2003). Such homogeneity in itself does not imply a flaw in the curriculum design. However, improvements to curricula can be made when explicitly modelling tertiary curricula with the aim of achieving learning outcomes, rather than accepting a curriculum that is simply the status quo. Furthermore, it is questionable whether the current homogeneity of economics curricula, as well as curricula being developed without threshold concepts in mind is indeed best-practice. One way of improving entry-level economics curricula is by focusing on the threshold concepts of economics.

While there are threshold concepts in economics, as elaborated in the next section, these are arguably not explicitly addressed in entry-level economics units. The threshold concepts in economics are arguably scattered throughout the various content modules and lecture topics. Thus, these are presented to students in an implicit rather than an explicit sense. A disadvantage of this approach as noted by Meyer & Land (2003), is that the targeted student cohort could potentially not be presented with an opportunity to grasp the threshold concept itself. Therefore, the students could be unable to understand the presented theory of a module, and the students could be unable to apply their knowledge in varying circumstances and scenarios.

Threshold Concepts

According to Meyer & Land (2003), threshold concepts are transformative, integrative and troublesome concepts that give practitioners a lens, portal or a gateway to view scenarios that they will experience, or problems that they are presented with. A curriculum designed around threshold concepts would revolve around training students to utilise these transformative and integrative concepts to approach contemporary, dynamic problems. This is thus a departure from a content-based curriculum that revolves around imparting content which these students may find irrelevant currently and/or in their future endeavours.

Thus, the theory of threshold concepts is an important recent development in discipline-based higher education research, (Male & Ballie, 2011). The threshold concept framework can prove to be a useful gateway, portal and lens for academic designers to examine their teaching and learning practice. However, relatively little work has been carried out on the scope of threshold concepts in economics curricula. The discipline of economics, having evolved over the last two centuries, with several conflicting schools of thought, has resulted in an economics curriculum that simply presents mainstream economics ideas (Alauddin and Valadkhani, 2003). The chronology of a typical entry-level undergraduate economics unit presents mainstream economics ideas, as a series of modules of content, without regards to the threshold concepts of economics themselves.

The pioneers of threshold concepts in economics are Davies (2006), and Davies & Mangan (2005, 2007), who have researched and authored several papers on the topic. Firstly, the researchers argued that recognising the transformativeness of threshold concepts would amount to a paradigm shift in a learner's thinking within the discipline of economics. Secondly, the researchers were able to present a case for a web of threshold concepts in the discipline of economics. Thus, in economics, the acquisition of multiple threshold concepts causes yet a further transformation of the individual. This further transformation of the individual occurs because: while each threshold concept is transformative in itself, the synergy of multiple threshold concepts in economics presents yet another transformative experience for the learner. Thus, Davies & Mangan (2005) research presents the finding that rather than a hierarchy of threshold concepts in economics, the threshold concepts of economics exist within a web or inter-relatedness.

Threshold concepts are a useful tool, when the issue at hand is that a curriculum may be content-focussed (Cousin, 2006). If threshold concepts are initially identified and isolated, this then empowers lecturers to determine where students tend to get stuck. With this insight, lecturers are able to not only design the curriculum, but also the learning activities, assessment tasks, as well as student feedback systems (Hedges & Pacheco, 2012). All of this attention will assist the transformation of the student in terms of the respective discipline. Another challenge for curriculum design is to incorporate student contemporary life in relation to these concepts. This is because the threshold concept approach is not only a way of thinking but also a way of practice.

Motivation

In conclusion, there is a pedagogic need to transform the economics curriculum. The evidence of this need can be seen in the literature of threshold concepts itself. Furthermore, the evidence of this need can be seen in the UK economics curriculum framework which is explicitly formulated around the threshold concepts of economics (QAA, 2007). By transforming the economics curriculum by integrating threshold concepts, learners should be able to grasp the concepts of economics in depth, and learners should be able to apply these concepts to the dynamic world that they will graduate into. This dynamic world is one which the existing, content-based curriculum is unable to adequately prepare them for, as the content may in fact be, or eventually become irrelevant.

By looking at the literature on threshold concepts in economics to date, this paper proposes and develops a transformed higher education, entry-level economic curriculum by integrating threshold concepts. Finally, this paper proposes that an explicit formulation of economics curricula based on these developments in the literature on learning and teaching, should result in an engaging student experience for entry-level economics students, enhanced learning outcomes, as well as developing their graduate capabilities. This is the first comprehensive study to apply a pedagogy based on threshold concepts across an entry-level economics course. The outcomes of this research could help academics in economics to transform economics curricula by integrating threshold concepts.

Methodology and Framework

Curriculum Re-design

The University of Auckland undertook a pedagogical innovation incorporating threshold concepts into their economics curriculum (Hedges & Pacheco, 2012). To these curriculum designers in the economics department, it was clear that the only way to achieve their objectives, within the given the constraints, was to take a ‘less-is-more’ approach. The designers agreed that the approach that would best facilitate a ‘less-is-more’ approach would be a pedagogy based on threshold concepts. With respect to economics, there was a body of literature of threshold concepts within the economic discipline for the designers to draw on. Central to this was the ‘Embedding Threshold Concepts’ project, discussed later in this paper, where this project had produced a number of resources to aid curriculum design based on these ideas.

While the author draws upon the research of Hedges & Pacheco (2012), the author first considered how the integration of threshold concepts can transform the economics curricula. Thus, the author first considered the key objectives of an economics curriculum. Drawing upon the average objectives of economics curricula across universities (Thornton, 2012), the key objectives of an economics course can be broadly stated as to:

- Provide students with specialised knowledge, techniques and the language necessary for undergraduate studies in economics and other business courses.
- Introduce students to basic economic theory and the application of economic theory to practical situations domestically and internationally.
- Enable students to demonstrate their understanding of a range of economic and social issues by making use of economic theories and concepts.

There is a tendency among lecturers to essentially overload their curricula with content, (Cousin, 2006). If however, curriculum designers were to focus on designing curricula around threshold concepts; this would enlighten designers to make optimal decisions about what is essential to grasping the discipline or subject. In essence, as noted by Hedges & Pacheco (2012) the threshold concept approach to curriculum design is a “less is more” approach. One place for curriculum designers to begin redesigning curricula is by recognising what is crucial and difficult to grasp by the majority of learners, (Cousin, 2006).

The Threshold Concepts of Economics

A team of researchers and lecturers in the ‘Embedding Threshold Concepts in First Year Undergraduate Economics’ (ETC project) outlined the concepts that were crucial and difficult for the majority of learners. This project was funded by the Higher Education Funding Council for England (HEFCE) and the Department for Employment and Learning (DEL) – in the UK, under the Fund for the Development of Teaching and Learning. As part of this project, lecturers were briefed on the characteristics of threshold concepts. At the conclusion of the project, the group agreed on the importance of the recognition of threshold concepts within economics with regard to the learning and teaching of the discipline (Davies & Mangan, 2005). The threshold concepts developed by the ETC Project as reported by Davies & Mangan (2006) and cited by several researchers on threshold concepts in economics (Cousin, 2006; Shanahan, Foster & Meyer, 2006; Hedges & Pacheco, 2012) are:

- Economic Models
- Opportunity Cost

- Marginal Analysis
- Equilibrium and Disequilibrium
- Markets – Interactions and Structures
- Elasticity
- Efficiency
- Comparative Advantage
- Real versus Nominal
- Cumulative Causation

Just as this team, economics lecturers through their teaching experience, become aware of topics that are difficult for students to learn. For example, in the author's own teaching experience, the author observed that seeing through the lens of opportunity cost was indeed troublesome for most students in economics. Yet these difficult concepts may indeed be the ones necessary for their development as economists. These are the transformative, integrative and troublesome threshold concepts that will be useful to both the organisation as well as the focus of learning and teaching.

Transforming the Economic Curriculum

Sample Set

The researcher, in their role as the unit convenor in the first year course, 'Microeconomic Principles' ('ECON111') at Macquarie University transformed the economics curricula of the 2015 offerings of the course, by integrating threshold concepts. This sample was chosen as it embodied a diverse academic cohort where all undergraduate students in the university's faculty of business, are required to take the course of ECON111 as part of their program. These programs include the degrees of: Bachelor of Economics, Bachelor of Applied Finance, Bachelor of Actuarial Studies, Bachelor of Business Administration, Bachelor of Business Analytics, Bachelor of Business Leadership, Bachelor of Marketing and Media, and the Bachelor of Commerce. Within a Bachelor of Commerce, students can choose from a diverse range of majors, being: accounting, professional accounting, business information systems, decision science, economics, entrepreneurship, finance, human resources, international business and marketing. These diverse degree programs and majors, also entails a cohort with diverse academic abilities, mainly due to the subjects studied in secondary education, as well as the differing entry criteria into these programs. In summary, the course, ECON111 is a suitable

sample to have its course transformed by the integration of threshold concepts. This suitability is due to the wide array of programs that the course is a requirement for. Furthermore, the course entails a large sample size, with enrolments in the course being approximately 1,400 students per semester.

Course Content

The one thing that the researcher kept unchanged in the 2015 offerings, was both the quantity and the quality of the content of the unit. Moderation by the Department of Economics, and the designation of a specific 'Unit Moderator' ensured that the content, quality and academic rigour of the unit remained as is, since the previous curriculum implementation in 2009. The official course guide also confirms that the coverage of topics and content was identical in 2015.¹ Further details on the strict academic standards, in integral components of the course are detailed below:

- Lectures – The lecture coverage was identical to the previous offerings of ECON111, as outlined in the next section. However, there was a change in the ordering of the lectures to explicitly highlight the threshold concepts of economics.
- Tutorials – Tutorial questions were drawn from the database of tutorial questions from the past offerings of the unit. However, the tutorial questions were updated with contemporary examples and current news to engage and highlight the threshold concepts of economics.
- The Assignment – Due to a re-ordering of the lecture topics, the assignment could explicitly engage the threshold concepts of economics, encouraging students to apply the threshold concepts to the provided questions and stimuli.
- The Final Exam – The quality of the exam was identical to the previous offerings of the unit. This was ensured by the unit moderator. As the curriculum had been transformed, the final exam now included the explicit use of case studies, unlike in previous offerings, to encourage students to apply the threshold concepts of economics to the given case studies.

Thus, despite the curriculum re-design, the quality, rigour and standard of the unit were strictly adhered to, while allowing for the engagement of threshold concepts throughout the student learning experience.

¹ Current and archived course guides are available at units.mq.edu.au

Utilising the researcher's lens of threshold concepts, the aforementioned literature review, as well as the benchmark UK economic framework discussed in the next section of this paper, the researcher executed three pedagogical approaches to assist a diverse cohort of students through:

1. A transformation of the sequence of lecture topics, to explicitly integrate threshold concepts – to both engage students and provide opportunities for the application of these threshold concepts.
2. A transformation of the learning & teaching activities – to bring the application of knowledge to the fore, to both engage and assist students throughout the semester.
3. A transformation of assessments from an 'assessment *of* learning' to also an 'assessment *for* learning' – to engage students and give them opportunities to apply the threshold concepts of economics.

Benchmark Framework

Utilising the threshold concepts of economics to transform the economic curriculum has already been adopted in the UK. The UK's Quality Assurance Authority's (QAA) Benchmark Statement for Economics (2007) outlines the framework for higher education providers. The UK framework for higher education in economics is to be framed upon:

- Subject knowledge and understanding.
- Subject specific skills.
- The transferable concept.
- Numeracy.

Thus, it can be seen that just one of the four pillars of the UK framework is to do with the content of economics itself. The other three pillars are to do with generic skills that are applicable to non-economics-specific contexts. Thus, this framework deliberately acknowledges that the economics curriculum is catering to students who may not necessarily major in economics. There is an acknowledgement that for subject specific skills: "Some of the attributes that a graduate in economics possesses are generic and not specific to the study of the subject. Their enhancement would be part of any degree program." (QAA, 2007, section 5.1). Furthermore, there is an explicit formulation of the UK economics curriculum around threshold concepts, termed in the document as the "transferable concept": "From learning economic principles, the typical student acquires a facility with some key concepts that are present in most of the decision problems that they are likely to face subsequently in their careers," (QAA, 2007,

section 5.4). The UK framework explicitly lists what it terms the transferable concepts, which are indeed the threshold concepts of economics listed by the ETC Project.

Curriculum Re-design

As these threshold concepts listed by the QAA are indeed the ones agreed upon by the ETC Project as well as the literature since (Cousin, 2006; Shanahan, Foster & Meyer, 2006; Hedges & Pacheco, 2012), the researcher utilised these threshold concepts to transform the curriculum of ECON111.

Through the researcher's experience in lecturing the unit, the researcher was able to identify where the threshold concepts are best exemplified in the previous, or legacy, content of ECON111. The researcher then utilised this knowledge to re-sequence the lectures in ECON111. This ensured that the curriculum's weekly progression was guided by the threshold concepts of economics, rather than a weekly progression that was guided by the course content. Never-the-less, the researcher neither aimed to reduce the quantity nor the quality of the unit's legacy content. Rather, the intention was to use the lens of threshold concepts itself, to deliberately re-think the way the content was structured throughout the 13 weeks semester. This was done, with the diverse cohort in mind, the aforementioned literature on learning & teaching in formulating economics curriculum, and finally, the aforementioned benchmark UK framework as a guide. Prior to the 2015 offerings of ECON111, the researcher had already trialled the curriculum sequence discussed below in the summer semester of 2014 with success both in terms of the student satisfaction survey results as well as the overall grade distribution. The researcher worked through the lecture content of the past offerings of the content of the unit, and re-structured the weekly lecture schedule as shown in Table 1.

Table 1 – Curriculum Re-structure

	Previous offerings	2015 offering
Week 01	Introduction to Economics	Introduction to Economics and the PPF
Week 02	PPF and Comparative Advantage	Producer Theory
Week 03	Demand and Supply	Perfect Competition
Week 04	Elasticity	Demand and Supply
Week 05	Efficiency	Monopoly
Week 06	Government Actions in Markets	Monopolistic Competition
Week 07	Externalities	Elasticity
Week 08	Consumer Theory	Efficiency
Week 09	Producer Theory	Externalities
Week 10	Perfect Competition	Government Actions in Markets
Week 11	Monopoly	Consumer Theory
Week 12	Monopolistic Competition	Game Theory / Oligopoly
Week 13	Oligopoly / Game Theory	Comparative Advantage

As can be seen from in Table 1, there was no change in the content of the unit. The researcher was able to utilise the research and literature on threshold concepts, the existing legacy content of the unit, as well as the researcher’s own experience to re-structure the lecture sequence to deliver the intended learning outcomes of the unit. The perceived and achieved advantages are as follows:

Introducing the production possibilities frontier (PPF) in Week 01 immediately introduces students to one threshold concept of economics, being the *threshold concept of economic models*. From the onset, students are made familiar with the economist ways of thinking, being that economists utilise models / graphs to aid their viewing and analysis of the world. Having the PPF introduced in Week 01 also engages the economics *threshold concept of opportunity cost* with a practical application. In previous offerings, as Week 01 tended to be introductory, opportunity cost tended to be via example in Week 01, and via application in Week 02. Furthermore, in previous offerings, students would only engage in the threshold concept of economic models in Week 02.

Introducing Producer Theory in Week 02 immediately introduces students to the topic which is heaviest on graphs, slopes, marginal and averages – all key mathematical elements of an economic model. The lecturers were able to both teach the content of topic as well as utilise the topic to teach students the essentials of graphing, drawing, reading and interpreting graphs in terms of slopes, marginal and averages. Given the changing and diverse cohort, addressing their mathematical and graphing skills earlier on was essential and integral to the unit, and allowing a deeper engagement in the *threshold concept of economic models*. The added benefit of this approach thus taught both the relevant content of the unit as well as addressed the diverse mathematical issues, and thus did not compromise on lecture time which would have otherwise involved a separate week of the curriculum to focus on mathematical concepts.

Introducing Perfect Competition in Week 03 immediately introduces students to the *threshold concept of marginal analysis*, via a practical analysis and hence gauge its importance in decision-making. In previous offerings, the threshold concept of marginal analysis was introduced in Week 02 via the PPF model which is already an abstract model in itself. Previously, marginal cost was introduced via the slope of the PPF as the amount of goods given up to produce a unit of another good. Whereas, marginal benefit was previously introduced as the amount of goods willingly given up in exchange for units of another good. This barter analogy is neither practical nor the student's everyday experience. Marginal analysis is a concept better introduced via perfect competition, where marginal cost, is exactly that – the opportunity cost of resources measured in dollars, and marginal benefit for a firm, being marginal revenue, is exactly that – the extra revenue generated by the sale of one extra unit measured in dollars. In previous offerings, this more practical application of marginal analysis was delayed until Week 10.

Introducing Demand and Supply (The Market) in Week 04 was the most troublesome for the teaching team in terms of understanding why Perfect Competition preceded the teaching of The Market. This was deliberately done the researcher to galvanise the threshold concept approach to curriculum design. The argument to teach The Market before Perfect Competition makes sense if lecture progression is guided by the content of economics – telling a story about economics to students who intend to major in the subject. The argument to teach Perfect Competition before The Market makes sense if lecture progression is guided by the *threshold concepts of economics* – telling a story to students who do not intend to major in the subject of why the application of these concepts are useful to their chosen discipline. All this without compromising on the

teaching of the content of the unit. In Perfect Competition, students are taught that firms are price takers, and that The Market decides the price. Thus, students were taught Perfect Competition in Week 03, and The Market, where the price came from, in Week 04. Separating the two, and reversing the coverage allows a diverse cohort to focus on understanding the application of threshold concepts to a Perfectly Competitive firm in Week 03, and then focus their understanding on the application of their knowledge to The Market in Week 04. Here, the students engage with the *threshold concept of equilibrium and disequilibrium*.

In Weeks 05 and Week 06, students were introduced to two other market structures being Monopoly and Monopolistic Competition. This engaged the *threshold concept of market [structures and interactions]* – where students begin to see how contemporary industries fit into the spectrum of market structures. Thus, by the mid-semester break, students had a fundamental understanding of the pinnacle of an entry-level microeconomics curriculum – Market Structures. Additionally, by bringing the topics forward, the researcher could ensure that students had enough time to grasp and tackle the content of these topics as well as the necessary threshold concepts. Furthermore, the researcher was then able to utilise the two week within-semester break to create an assignment designed to achieve the learning and teaching outcomes of the course via the application of the threshold concepts.

Additionally, this is a fusion of an example-led approach and a theory-led approach where the student has some point of reference to the economics that they are engaging themselves with. The students are taught some theory, then the theory is referred to via example. Following this, the further economic theories are built later, with the student already having anchored themselves in relevant examples. This is a direct benefit of the threshold concept approach as the application is central to the students' learning experience. As these topics were introduced earlier, rather than at the end of the semester, the coverage of elasticity and efficiency were deliberately removed from these topics, and this content was moved into specific lectures that focussed on the *threshold concept of elasticity* and the *threshold concept of efficiency* respectively. In legacy offerings of ECON111, elasticity and efficiency were covered earlier in the semester and then applied later during the session. However, in this offering, elasticity was introduced in Week 07 and then immediately applied to the market structures so that students could engage the threshold concept of elasticity in a practical application of the content. Here the students can now view the market structures, with the portal and lens of the *threshold concept of elasticity*.

Similarly, efficiency was introduced in Week 08 and then immediately applied to the market structures so that students could engage the *threshold concept of welfare and efficiency* in a practical application of the content. The coverage of elasticity and efficiency in this way, not only gave students the opportunity to learn and apply the content in the same lecture week itself, but it also gave an opportunity for revision of the prior topics in the session as well – again an advantage with a diverse cohort. Students could now view the market structures, both in theory and practice, with the portal and lens of the *threshold concept of efficiency*.

In previous offerings of the unit, Government Actions in Markets was introduced prior to Externalities and Economics of the Environment. In this offering, the ordering was reversed. Keeping Externalities before Government Actions in Markets allowed the students to apply the *threshold concepts of welfare and efficiency* and see market failures in action. The lecture following the topic of Externalities then introduced students to the notion of governments intervening in the cases of market failure to improve welfare and efficiency.

By the end of Week 10, students had been taught most of the content which is relevant to ECON111 as a foundation course in the faculty of business for students from the aforementioned diverse range of disciplines. This left the topics of Consumer Theory, Game Theory and Comparative Advantage / Trade as the last topics for the semester. These topics were utilised to introduce students to further their thirst in economics courses.

Consumer Theory was introduced in Week 11. The tools in this topic, and the topic in general re-introduces students to the *threshold concept of [mathematical] economic models*, the lens used in second and third year microeconomics units. The (mathematical) maximisation of a given objective within the context of a constraint is a lens that continues to be utilised in intermediate microeconomics. Students were given a hint of the calculus which would be forthcoming if they chose to major in economics in the future.

Game Theory / Oligopoly and Comparative Advantage / Trade were kept for Weeks 12 and 13 as traditionally, the content takes an hour of lecture time, thus leaving time for revision in these last two weeks of the sessions. Game Theory is always a problematic flow in pedagogy, as the topic uses a lens and uses tools which are not part of the usual flow of an entry-level course. Having Trade as the last topic, allowed the researcher to invite students to the next entry-level course in economics, being macroeconomic principles. Here students study the country as a whole unit and its interactions with the global economy. This last topic, engaged the *threshold concept of comparative advantage*, highlighting its importance as a microeconomic concept that will allow the student to use this lens in the other first year economics course of macroeconomics.

Results

A 'Learner Experience of Unit' (LEU) survey was conducted at the end of each semester to gauge the student experience of the transformed curriculum. The survey is part of the university policy, with specific questions included by the researcher to gauge the student experience of the curriculum transformation in 2015. Of the 1,505 students enrolled in the first semester, 599 students took part in the survey, giving a response rate of 39.8%. Of the 1,220 students enrolled in the second semester, 641 students took part in the survey, giving a response rate of 52.5%. This more than fulfils the university and national benchmark of a requirement that 25% of the student cohort needs to provide feedback for a valid result. The LEU survey consisted of 22 questions, 5 questions of which were relevant to the theory and application of threshold concepts. These questions (using the coding system of the survey) are displayed in Table 2.

Table 2 – Survey Questions

Question Code	Survey statement
CRU05	The unit content was organised in ways that assisted my learning.
CRU06	Teaching sessions (face-to-face and/or online) kept me engaged in the unit.
CRU07	The unit's learning activities (e.g. assessments, in-class or online discussions and exercises) were effective in developing my understanding.
CRU11	This unit contributed to my development of one or more of the MQ Graduate capabilities.
CRU12	This unit challenged me intellectually.

For each survey statement, students were required to give a response on a five-point Likert scale, with responses ranging from 'Strongly Agree' to 'Strongly Disagree'. The average survey responses appear in Table 3. To the researchers knowledge and LEU was not conducted in the prior session, 2014 S2 and the results of the LEU of 2014 S1 are not available to the researcher. It must be noted that 2013 S2 was convened by the same unit convenor of 2015.

Table 3 – Student Average Responses out of 5.0

Question	2015 S2	2015 S1	2013 S2
CRU05	4.7	4.7	4.3
CRU06	4.5	4.5	4.1
CRU07	4.6	4.6	4.1
CRU11	4.4	4.3	4.0
CRU12	4.5	4.4	4.3

The student feedback indicates that the curriculum transformation around threshold concepts, to deliver the learning outcomes of the course were not in vain. Across all the five questions, there were improvements in the student responses compared to the last survey conducted in Semester 2, 2013 under the same unit convenor. Furthermore, the responses across both semesters of 2015 were consistent.

Conclusion

Given the transformed topic sequence with an eye for threshold concepts, the new curriculum also facilitates the transformation of the learning and teaching activities, as well as a transformation of the assessments. Through this pedagogy, with a lens of threshold concepts, the entire curriculum structure, and not just the lectures, is for learning & teaching. Through the course re-structure, some content is moved out of lectures deliberately into tutorials, group work, home-work and assignments, to engage the threshold concepts of economics. The lecture is a part of the learning & teaching activities of a curriculum where not all but most of the content is covered, and not-covered-in-lectures content (this content being - further applications to the real-world, and in-depth analyses that requires critique of the models) is delivered via group discussion to further engage the threshold concepts of economics. Content that allows students to critique and question the models, as well as decide what models need to be applied to what real-world situation is more engaging in a tutorial. Students can argue their cases with peers, with the facilitation of such a discussion by their tutors which amounts to an overall engagement of the threshold concepts of economics. Rather than the lecturer critiquing the model for the student, and the lecturer directing how each model fits a specific real-world application – students are presented with examples and case-studies in tutorials, to engage the threshold concepts in small groups, and discuss why (or why not) each model fits a particular scenario and

critically review the model's assumptions for that case. This pedagogical approach thus engages a diverse student cohort (Meyer & Land, 2005).

Furthermore personal reflection and application of knowledge in the take-home assignments allows the student to view the presented problems with the required lenses and gateways of thinking and practice. Here, according to the research of Boud (2000), assessments are *for* learning as opposed solely being assessments *of* learning. Content allowing students to connect the various economic concepts and models, and to assess a deeper understanding is more engaging in an assignment context – here students can reflect on what they have learnt and connect the content together without the lecturer delivering the entire curriculum to them. Furthermore, due to the re-structure of the unit, some gaps will only be filled in lectures after the student submits their assignment – thereby forcing the student to undertake research, and develop a university and world-ready skill. The further advantage here is that the gaps are filled in lectures after the research has already be done by students – the curriculum implicitly facilitates revision of the unit's material, training students in the ways of practice, and crossing the liminal state (Meyer & Land, 2003).

As discussed, the researcher utilised three approaches to assist and engage a diverse cohort via a transformation of the curriculum around threshold concepts. This incorporated:

1. A transformation of the sequence of lecture topics, by explicitly integrating threshold concepts.
2. A transformation of the learning & teaching activities, by highlighting the threshold concepts of economics.
3. A transformation of assessments from an “assessment *of* learning” to also an “assessment *for* learning” by giving students the opportunity to apply their knowledge.

The result was both an improvement in the Learner Experience of the Unit (LEU) in the sample period. According to student responses, compared to previous offerings, the new curriculum is: better organised in a way that promotes student learning, offers face-to-face sessions that are more engaging, has assessments that are more effective in developing student understanding, contributes more to the development of their graduate capabilities, and the course is more intellectually challenging.

Thus, the curriculum that has been transformed by integrating threshold concepts is now more engaging for the diverse cohort, while still maintaining the quality and rigour of the course's legacy content. In summary, the curriculum transformation via the integration of threshold concept, promotes the application of knowledge, enhanced learning outcomes and improved graduate capabilities, by making the course more engaging for a diverse cohort.

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