Powerful Knowledge and Pedagogy in the Maltese Secondary School Economics Classroom

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Declaration

I, Emanuel Mizzi, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

This thesis explores how economics education offers secondary school students access to ‘powerful knowledge’; knowledge which they might not have access to at home or in the communities in which they live. The ‘powerful pedagogy’ that enables this epistemic access is also researched. The study is undertaken in the context of repeated explanatory and predictive failures and anomalies of mainstream economics, the school of economic thought which dominates school economics. The notions of powerful knowledge, knowledge bases for teaching and threshold concepts assist in developing a framework conceptualising powerful knowledge and pedagogy in a Future 3 economics curriculum. A qualitative research approach underpinned by a critical realist framework draws upon teachers’ and students’ perspectives and lesson observations for a deeper understanding of the economics teaching and learning process. Supported by the findings, the thesis conceives powerful knowledge as the blending of two components or types. The first type is discipline based knowledge arising when students grasp the threshold concepts of scarcity, choice, opportunity cost, marginality, demand and supply analysis, and market structures. The second type of powerful knowledge derives from the first type and enables the students to understand better the economic world around them, equips them with new ways of thinking about the economic world, and enhances their criticality of thought in economic issues and their participation in economic debates. The findings indicate that powerful pedagogical practices that promoted the students’ engagement with disciplinary knowledge in economics consisted of emphasising the process of reasoning, connecting economics knowledge to real life, employing the teachers’ specialist knowledge to develop PCK representations, and adopting a variety of teaching strategies. The findings of this study call for the introduction of economics education in the Maltese State secondary schools (as is available to the students in the Independent and Church schools).

Impact Statement

The original contribution of this thesis lies in extending the theory of powerful knowledge to the subject of school economics by articulating the nature of powerful knowledge and pedagogy that are key elements of a Future 3 economics curriculum. No peer-reviewed research has been undertaken that explores powerful knowledge and pedagogy in school economics. This study fills the gap in knowledge by suggesting a vision for a Future 3 economics curriculum that has the potential to offer students access to disciplinary knowledge that develops their capabilities and agency to make informed choices when they reach their adult lives.

By conceptualising how and in what ways school economics can be powerful for young people, this thesis makes an argument for the inclusion of the subject in a school's curriculum. Students attending secondary schools have a right to an education that enables them access to economics knowledge that is empowering in developing their human powers, capabilities and agency. In particular, this research calls for the introduction of economics in the Maltese State secondary schools (as is available to students in the Independent and the Church schools). This aspect acquires more relevance when considering that my PhD has been partly sponsored by the Maltese government.

This thesis contributes to the very limited body of evidence concerning the enactment of teaching and learning in secondary school economics. No peer-reviewed research, for instance, is available concerning secondary school business education in Malta. The contribution of this study towards economics education acquires relevance in that it draws upon evidence gathered from different sources, being teachers, students and lesson observations. It provides a unique narrative of how economics education is experienced by students in Malta, contributing to satisfying the need of prioritising economics teacher development that focuses on learning as experienced by students.

The reflection, discussion and knowledge generated by the arguments of this thesis in disseminating the findings both in Malta and abroad do impact upon the understanding and the enactment of the secondary school economics curriculum. This applies beyond the confines of the secondary school class, such as in higher education and undergraduate levels. I have experienced this reflection and enthusiasm while presenting at conferences (Mizzi, 2019a, b, 2020a, b, 2021a) and during my lectures

and interactions with Maltese business education student teachers and experienced teachers. I have observed, for instance, how student teachers reflect, grow enthusiastic and mature into enacting a teaching and learning process that facilitates their students' engagement with economics knowledge whilst making their learning enjoyable. I claim that by providing teachers and student teachers the opportunity to reflect upon this research's findings assists into bringing economics to life, dismissing the reputation that it had earned along the years as being a 'dismal science'.

During my six-year long research journey I have experienced a profound effect on my own development as a teacher educator of business education student teachers. The research study was for me an opportunity to understand more deeply the discipline of economics and the enactment of the teaching and learning process as conceptualised in a Future 3 economics curriculum. This formative experience empowers me to educate in a much more competent way the student teachers entrusted to my care in the process of enabling future young generations to savour the joy of learning economics and to experience what school economics has to offer them in terms of powerful knowledge.

This study also impacts by instigating further much-needed discussion about what constitutes powerful knowledge and pedagogy in the other school subjects, especially the other business education subjects such as accounting, marketing and business studies. Although the context in which the theory of powerful knowledge has been explored is rooted in the Maltese Islands, the questions and curricular debates apply elsewhere as they focus on the ubiquitous themes of knowledge selection, disciplinary knowledge and its expressions, and the role of pedagogy.

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List of Abbreviations

AP - average product

ARP - average revenue product

DEED - definition, explanation, example, diagram

DREIC - description, retroductive, eliminate, identify, corrections

EU – European Union

FG - focus group

MC - marginal cost

MP - marginal product

MRP - marginal revenue product

MSE - Malta Stock Exchange

PCK - pedagogical content knowledge

PPC - production possibility curve

SDGs - sustainable development goals

SEC - Secondary Education Certificate

TCK - technological content knowledge

TK - technological knowledge

TP - total product

TPCK - technological pedagogical content knowledge

UCL – University College London

UN - United Nations

1. Introduction

In this chapter I discuss background information relating to the contexts and goals of my research study. I describe the purpose and focus of the research, provide background information about Malta and its education system, introduce the ideas of powerful knowledge and threshold concepts, and explain how the research questions evolved during the course of my study.

1.1 Purpose and focus of the research

The purpose of this research study is to explore powerful knowledge and pedagogy in the Maltese secondary school economics classroom. The reason for this interest stems from my background as a teacher of business studies and economics for twenty years and, for these last seven years, as a full-time teacher educator of business education students at the University of Malta. This personal and professional experience has had an influence on the research questions and the research approach adopted in this study.

Business education at secondary school level in Malta incorporates accounting, business studies and economics. To narrow the scope of my research, I focus on the teaching and learning of economics as economics education constitutes my core professional work, and since economics is not taught in State schools, I want to make a case for its introduction in this sector. Young people are entitled to an economics education which enables them to move beyond their current knowledge and experiences (Young, 2008, 2021) and understand the world around them better (Brant and Cullimore, 2012; Jephcote and Abbott, 2005b). This perspective entails inspiring every student towards a deep approach to learning and thinking in the subject (e.g., Arnold, 2005; Ashwin, 2015).

My six-year long research journey has had a profound effect on my own development as a person, as a researcher and as a teacher educator of Maltese business education student teachers. During my experience as an educator, I strive to understand my subject better, both in its substantive form and its enactment in the classroom. My intention is that this study contributes to the research evidence in secondary school economics education, of which there is a paucity (Davies and Brant, 2006; Shanks, 2020).

1.2 Background and context of the research

This section provides background information relating to the context in which this research was conducted.

1.2.1 Malta in brief

Malta is the fifth smallest state in the world, geographically situated in the central Mediterranean Sea, south of Sicily and 200km north of North Africa, with a population of around 515,000. It is an archipelago of three islands: Malta (316 square kilometres), Gozo (67 square kilometres) and Comino (2.6 square kilometres). Situated in the middle of the Mediterranean it has been considered a strategically important location (Gellel and Buchanan, 2011).

The population density is one of the highest in the European Union and in the world. Malta gained independence from Great Britain in 1964, became a Republic in 1974 and joined the European Union in 2004. There are relatively low levels of regional, cultural or ethnic divisions, although particular regions such as the Inner Harbour Area are considered relatively socio-economically disadvantaged. The official languages are Maltese and English. The native Maltese language is a Semitic tongue written in the Latin alphabet, with a strong Italian influence. English is spoken and written widely in Malta, and it is taught from the first year in the primary school. Education is compulsory between the ages of five and sixteen years.

1.2.2 The Maltese education system

It is a priority for Malta to employ educational practices and strategies that help to reduce poverty, augment the country's intellectual capital, and foster and enhance social cohesion and competitiveness through employability (Bezzina and Cutajar, 2012; Camilleri and Camilleri, 2016; Mifsud, 2016, 2017; Ministry of Education and Employment, 2012). Evidence of this priority is the history of educational law updates, reforms, counter-reforms and policies intensification in the last four decades (Ministry of Education and Employment, 1999, 2005, 2012, 2016, n.d.; education.gov.mt, 2022). For instance, a major reform that has changed the governance of the Maltese educational sector from a centralised system to an autonomous one has been the initiative *For All Children to Succeed* (Ministry of Education and Employment, 2005). This reform has geographically clustered primary and secondary State schools into ten colleges. To address equity, social justice, diversity and inclusion in compulsory

education, the *Framework for the Education Strategy for Malta 2014-2024* plans to provide learners with skills and talents for employability and citizenships in the twenty-first century. The aim is to reduce the gaps in education outcomes, reduce the high incidence of early school-leavers, and increase participation in lifelong learning. The launch of *MyJourney* (Ministry for Education and Employment, 2016) aims to move the educational sector from a 'one-size-fits-all' system to a more inclusive one through the choice of academic, vocational or applied subjects.

The backbone of Malta's education programmes is formed by the National Curriculum Framework (Ministry of Education and Employment, 2012) and the Learning Outcomes Framework (Ministry of Education and Employment, n.d.). These are intended to serve as national benchmarks of quality education for all schools, providing all stakeholders with guidance as to what students need to learn during the stages of their compulsory education. Being translated into law in 2012, the *National Curriculum Framework for All* safeguards the education entitlement for all students (Ministry of Education and Employment, 2012). It proposes a *Learning Outcomes Framework* as the keystone for learning and assessment throughout the years of compulsory schooling (Ministry of Education and Employment, n.d.). The aim of this framework is to provide schools with autonomy and flexibility into developing programmes that provide quality education which addresses the particular needs of their learners, as part of a coherent strategy for lifelong learning.

The Maltese educational system has three main educational providers: the State, the Catholic Church and the Independent sector. The State and the Church cater for 68.4 per cent and 22.5 per cent of the student population respectively; the remaining 9.1 per cent of students attend Independent schools (National Statistics Office, 2021). The central government is responsible for the State schools, while the Church sector is run by the Maltese Archdiocese and is supported by the Secretariat for Catholic Education acting as the schools' administrative headquarters. The Church and State are bound with an agreement reached in 1991, where through an exchange of assets, the government committed itself to support the Church schools by funding the salaries of staff and any other support at par with the State schools, on the condition that Church-school education is free for their students. Independent schools are privately-owned schools which are regulated by their own internal statutes. All schools in the

archipelago are bound by the Education Act of the country, and standards are regulated by a central body within the Education Division. The reform *For All Children to Succeed* has mainly affected the governance of the State sector.

1.2.3 Secondary school economics education in Malta

Students proceeding to Year 9 of their studies at secondary school can opt for accounting, business studies and/or economics. State schools offer accounting and business studies courses; although economics is also included in the *National Curriculum Framework for All* as a further elective. With regard to Church and Independent schools, accounting and economics are the main subjects taught. Table 1 shows the number of students studying economics in State, Church and Independent schools during the scholastic year 2018-2019 when the data was collected.

State schools	Church schools	Independent schools	Total
0	270	150	420

Table 1. Students studying economics in State, Church and Independent schools during scholastic year 2018-2019 (Ministry of Education and Employment, Malta; Church Secretariat, Malta)

1.3 Powerful knowledge and threshold concepts

This thesis employs the notions of 'powerful knowledge' and 'threshold concepts' as constructs that have assisted the exploration of the teaching and learning process in the secondary school economics classroom.

The notion of powerful knowledge emphasises the importance of knowledge in teaching and curriculum development (Young, 2008). Such knowledge is defined as being subject-specific, coherent, conceptual disciplinary knowledge, and embraces what are considered to be the key concepts, the main procedures and processes of a discipline (e.g., Young, 2008, 2013a, 2014a, 2021). It is the entitlement of every student to have access to this knowledge, being better, more reliable and nearer to the truth about the world we live in (Young, 2008, 2014). Powerful knowledge enables teachers to delve deeper into what is taught and empowers students to move beyond the experience they bring to school and make decisions that influence their lives in a

positive way (Harland and Wald, 2018; Mitchell and Lambert, 2015; Young, 2008; Young and Muller, 2010).

Meyer and Land (2003, 2005, 2006) introduced and elaborated upon the notion of a threshold concept to refer to concepts in any discipline that have a transformative effect on student learning. These concepts act like 'conceptual gateways' or 'portals', "opening up a new and previously inaccessible way of thinking about something" (Meyer and Land, 2003, p.1). Academics in a number of disciplines are using the idea of threshold concepts to inform their pedagogy in ways that make sense within their own communities of practice and for their own students (e.g., Davies, 2018; Magdziarz, 2016; Meyer and Timmermans, 2016; Timmermans and Meyer, 2017); "threshold concepts have found an immediate appeal as being a 'pedagogically fertile' and energising topic to consider" (Meyer and Land, 2005, p.373). Since the first work on threshold concepts in economics by Meyer and Land (2003), the idea of threshold concepts has been recognised as a useful tool for assisting economics teaching and learning (e.g., Davies, 2006, 2018; Davies and Brant, 2006; Davies and Mangan, 2007; Shanahan, 2016). It assists students to understand 'the economic way of thinking' (Davies, 2018; Shanahan, 2016).

1.4 Research questions

This section discusses how the research questions evolved during the course of my research. Initially, the framing of my study was to explore students' learning in the business education subjects taught in the Maltese secondary schools. This related to my role as a teacher educator of student teachers preparing to teach accounting, business studies and economics in secondary schools. The proposed title of the thesis was 'Curriculum, pedagogy and assessment in the Maltese business education classroom'. An underlying motivation was to contribute to the under-researched area of secondary school business education in Malta by mapping out business education and giving voice to the teacher and the student. My initial primary research question was: 'How is the curriculum and learning conceptualised and enacted in the Maltese secondary school business education classroom?' Five operational research questions guided this overarching research question:

a) What is the Maltese business education curriculum?
b) What teaching approaches do teachers use in business education?

c) How is learning supported in the business education classroom?
d) What are the students' perceptions of their learning of defined business education subjects?
e) How do curriculum, pedagogy and assessment interlink in the Maltese business education classroom?

After my initial two years reviewing the literature, I decided to narrow the scope of my thesis in order to offer more depth by focusing on the teaching and learning of economics as economics education constitutes my core professional work. I also want to make a case for its introduction in the Maltese State secondary schools.

I decided to employ the notion of powerful knowledge into assisting my exploration of how and in what ways economics teaching and learning enriches the education of secondary school students. This notion could assist me to make an argument for the introduction of economics as a subject in the State secondary schools. The first research question therefore explores how economics offers secondary school students powerful knowledge that enables them to think beyond their everyday experience. The second question researches how teachers enact an economics curriculum underpinned by powerful knowledge. These are discussed further in the methodology chapter (section 6.1). The title of the thesis was consequently adjusted to 'Powerful knowledge and pedagogy in the Maltese secondary school economics classroom'.

To address these research questions, I used different sources of data, consisting of lesson observations, interviews with teachers, and focus group interviews with students. These are discussed in chapter six.

1.5 Overview

This introductory chapter provides background to the research, the motivations for the study, and the research questions which the thesis attempts to address.

The literature review that follows focuses on four areas: economics education, threshold concepts, powerful knowledge, and the knowledge bases for teaching. These constructs have assisted me to explore and understand better powerful knowledge and pedagogy in Maltese secondary school economics education. In chapter five I develop a framework for conceptualising powerful knowledge and pedagogy in a Future 3 economics curriculum.

Following the literature review, chapter six outlines the methodology used in this thesis and the conceptual framework that underpins the research. It explains why a qualitative methodology is employed, my position as a researcher, the method adopted, ethical considerations, and the procedures for the analysis of the data.

I then explore the study's research questions by discussing what powerful knowledge in Maltese school economics looks like (chapter seven), and what pedagogical approaches promoted the students' engagement with disciplinary knowledge in economics (chapter eight).

The thesis concludes in chapter nine with a reflection about the research and its process, and a discussion that includes how the research questions have been answered, a reflection on the limitations and ideas for further research, and the contribution to knowledge.

2. Literature Review I: Economics Education

This chapter discusses the state of affairs of economics and economics education dominated by the neoclassical economics orthodoxy. This ideological preference for neoclassical theory also permeates the Maltese secondary school economics curriculum. An alternative conceptualisation for the discipline is then discussed, together with the resulting insights and implications for its teaching and learning.

First of all, what is economics? Marshall (1920) defines economics as "a study of mankind in the ordinary business of life", exploring "that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of well-being" (p.1). Subsequently, Robbins (1984) defines economics as "the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses" (p.16). This definition, or variations of it, has become a norm worldwide and a starting point for learning economics at school throughout the world (Brant, 2011, 2015).

Learning economics develops a deeper understanding of the world that enables students to make informed choices as consumers, citizens and workers (Brant, 2011, 2015; Davies and Brant, 2006; Grant, 2006; Jephcote, 2005; Jephcote and Abbott, 2005b; Krueger, 2019; Lipsey, 1989; Skidelsky, 2020; Walstad and Soper, 1991). Young people have an urge to understand the changing world in which they live and make it better (Brant, 2011, 2015; Brant, 2018; Brant and Cullimore, 2012; Brant and Panjwani, 2015; Grant, 2006; Skidelsky, 2020). Brant (2015, 2018) and Brant and Cullimore (2012) claim that evidence of this is the increasing number of students around the world who are opting to study economics. The discipline has much to offer them, such as assisting to 'think as an economist' (e.g., Arnold, 2005; Grant, 2006). Lawson (1997) contends that "there can be no denying that, whatever its longevity, orthodox economics is a project that is currently real and highly efficacious" (p.197). It is therefore a teacher's responsibility to enact economics teaching and learning in such manner as to make the subject relevant, alive and worth studying. Students may then experience that "95 per cent of economics is common sense – made to look difficult, with the use of jargons and mathematics" (Chang, 2014, p.3).

There are various ways of conceptualising the economy or 'doing' economics. These include the classical, neoclassical, Marxist, developmental, Austrian, Schumpeterian,

Keynesian, institutionalist and behaviouralist schools of economic thought. These different approaches to economics support different methodologies and ideologies. Each possesses particular strengths and weaknesses, depending on how it conceptualises aspects of the economy and the relationships among them. Although no one school should claim superiority over others, the neoclassical school has established itself as the dominant one.

2.1 The disarray in mainstream economics

There is a need for economists to think about and evaluate mainstream economics, its inherent limitations and state of disarray (Aldred, 2019; Brant, 2011, 2015; Brant and Panjwani, 2015; Fine, 2010; Lawson, 1997; Piketty, 2014; Shanks, 2020; Skidelsky, 2020). Schumpeter (1942), for instance, critiques the discipline for being non-dynamic in general and for a tendency among economists to operate with a formalistic and non-realistic concept of competition. Aldred (2009) argues that economics "is not what it appears to be" and "is an odd kind of science (if it is a science at all)", and that "many of those who call themselves economists peddle a narrow or simplistic view of economics to serve vested interests and political ends" (p.1). Fine (2010) contends that mainstream economics is "zombie-like", being "both dead and alive at the same time" (p.153). Blaug (1992) argues that "all is not well in the house" that contemporary mainstream or neoclassical economics "has built" (p.xxvii). Skidelsky (2020) claims that "economic theory, far from progressing like a giant tapeworm towards better knowledge, is rife with interminable arguments" (p.12). Lawson (1997) maintains that "its 'theoretical models' are increasingly found to be irrelevant to real-world matters" and that "its empirically based forecasting models do not forecast particularly well" (p.i).

Mainstream economics is also accused of being complicit with much of what has gone wrong with economic life in the last thirty years (Aldred, 2019; Dow, 2009; Krueger, 2019; Skidelsky, 2020; Spotton Visano, 2018, 2019). This includes failing to predict the global financial crises of 2007-2008; economists "have confidently declared that none of it is their fault – it is only that their principles have been improperly applied" (Fine, 2010, p.153). This and various problems that have come to light have led even its proponents to question the capacity of mainstream economics to account for real-world events or for assisting in policy formulation (Chang, 2014; Lawson, 1997; Skidelsky, 2020). This section 2.1 discusses this situation.

2.1.1 Heavy reliance upon positivism

The practices of mainstream, neoclassical economics are rooted within a positivist conception (e.g., Brant, 2011, 2015; Brant and Panjwani, 2015; Caldwell, 1982; Lawson, 1997; Lipsey, 1989; Piketty, 2014; Skidelsky, 2020). The 'disciples' of neoclassical economics want it to be more like physics than any other social science does, claiming economics should be "able to make 'hard' predictions" (Skidelsky, p.x), in an attempt to acquire scientific respectability (Brant, 2011, 2015; Piketty, 2014; Skidelsky, 2020). Economists are accused of suffering from 'physics envy' in trying so hard to emulate the natural sciences (Aldred, 2019; Chang, 2014; Skidelsky, 2020); "no other social science counts and measures its material so energetically" (Skidelsky, 2020, p.xi).

The inclination towards positivism has led economics to be perceived as less relevant to the world in which we live (Brant, 2011, 2015; Brant and Panjwani, 2015; Chang, 2011, 2014; Lawson, 1997). It is claimed that "economics can never be a science in the sense that physics or chemistry is" (Chang, 2014, p.5). Lawson (1997) maintains that this "widespread, rather uncritical, reliance by economists upon a questionable conception of science and explanation" is a major source of the problems facing neoclassical economics (Lawson, 1997, p.15); "the source of all the project's problems and difficulties (in dealing with an open system) stem from that project's very essence" (ibid., p.263). While attempting to establish theories about the behaviour of persons, economics perceives them as machine-like creatures (Chang, 2011, 2014; Skidelsky, 2020). Neoclassical economists find it difficult to digest that the "material they study and try to understand does not behave with the law-like regularity of natural phenomena. Humans are, uniquely, inventive animals" (Skidelsky, 2020, p.2).

Most secondary school and undergraduate university economics textbooks distinguish between positive and normative economics. Normative economics deals with values and ethical judgements, and concerns with "what ought to be" and is "inextricably bound up with our philosophical, cultural and religious positions" (Lipsey, 1989, p.16). Positive economics is proposed as being value-free and "an 'objective' science, in precisely the same sense as any of the physical sciences" (Friedman, 1953, p.4). It is "in principle independent of any particular ethical position or normative judgements" (ibid.).

Positive economics “appears to be the received view supported by the great majority of neoclassical economists” (Brant, 2011, p.117) and dominates at the school and university levels (Brant and Panjwani, 2015; Skidelsky, 2020; Spotton Visano, 2018, 2019), making a claim of science and the scientific method. Friedman (1953) and Blaug (1992), for instance, regard economics as a positive science composed of “a body of tentatively accepted generalisations about economic phenomena that can be used to predict the consequences of changes in circumstances” (Friedman, 1953, p.39). Blaug (1992) claims that “the central aim of economics is to predict and not merely to understand” (p.246). Progress in the discipline requires the testing and elaboration of existing hypotheses but also the construction of new ones. Mathematical and statistical techniques assume great significance.

Friedman (1953) claims that the task of economics is

> to provide a system of generalisations that can be used to make correct predictions about the consequences of any change in circumstances. Its performance is to be judged by the precision, scope, and conformity with experience of the predictions it yields. (p.4)

He argues that what counts is that a theory works, and that the realism of its assumptions is not important. He discusses the example of a minimum wage legislation. The objective is to achieve a “‘living wage’ for all” (ibid., p.5). He argues that such a legislation might increase poverty “by increasing the number of people who are unemployed or employed less advantageously and that this more than offsets any favourable effect on the wages of those who remain employed” (ibid., p.6). Brant (2011) and Brant and Panjwani (2015) challenge this assertion, contending that its objectivity rests on accepting a neoclassical model of the economy as truth and not just as a theory. Keynesian theory, for instance, may conclude that under certain conditions, a minimum wage may stimulate aggregate demand, thus decreasing unemployment. The ultimate actual scenario “will be a result of complex interactions of a wide range of variables, including human agency” (Brant and Panjwani, 2015, p.309). These authors contend that Friedman does not consider the agential nature of human behaviour which makes it unpredictable and open-ended. This is in contrast with a relatively closed system where causation allows a natural scientist to make predictions based on a theory.

2.1.2 Problematic ontological and epistemological assumptions

The positivist philosophy of science embraced by economists is highly problematic (Brant, 2011, 2015; Brant and Panjwani, 2015; Lawson, 1997; Skidelsky, 2020). It assumes that the world is "fixed, repetitive, unstructured and undifferentiated" (Bhaskar, 2017, p.18). By using scientific methods, mainstream economists claim to discover universal laws that explain and predict the world. They are driven to think of the social world as a potentially 'perfect machine' and model human behaviour to fit the requirements of such a conception (Skidelsky, 2020).

It is however questionable whether "logical deduction from tight assumptions is the best way of 'getting at the truth' of the world" (ibid., p.7). Natural scientists can, for instance, isolate variables and attempt to establish empirical regularities and constant conjunctions of events. The scenarios economists explore involve an uncontrolled number of variables. The objects of social science are "not just much more complicated than those of natural science but also qualitatively different. For social sciences such as economics, this makes objectivity almost impossible in practice" (Brant, 2015, p.9).

Because of "an implicit and uncritical reliance upon various results of positivism" (Lawson, 1997, p.42), contemporary economics ends up lacking "any explicit argument pertaining to its epistemological status - its status as knowledge" (Skidelsky, 2020, p.7) and "an effective neglect of ontology, by a lack of attention to elaborating the nature of (social) being or existence" (Lawson, 1997, p.xiii). Mainstream economists finish up disregarding philosopy to claim that economics is a positive science, "immune from judgements of value" (Skidelsky, 2020, p.7).

The generalised neglect of ontological enquiry is underpinned by the epistemic fallacy, "the reductionist ontology to epistemology" (Bhaskar, 2017, p.19). It is "the supposition that statements about being can always be rephrased as statements about knowledge (of being), that ontology can be reduced to epistemology" (Lawson, 1997, p.62). This error generates "an implicit ontology" (ibid.) in which statements about being are reduced to or explored in terms of statements about knowledge. Orthodox economics assumes a reductionist ontology, denies the differentiation of the world, its depth and the openness of the future, and offers a diminutive model of the human person (Brant,

2011, 2015; Brant and Panjwani, 2015; Lawson, 1997). Mainstream economists end up upholding that

> with enough data and computing power they can 'crack the code' of human behaviour. This quest - and the envy which inspires it - is misplaced. It drives economists further away from the 'real' world of humans whose behaviour they are trying to understand. (Skidelsky, 2020, p.6)

2.1.3 Reliance on static neoclassical models

Mainstream economics is dominated by theoretical and mathematical modeling (Brant, 2011, 2015; Brant and Panjwani, 2015; Lawson, 1997; Piketty, 2014; Skidelsky, 2020). These models allow for a limited range of possibilities, poorly predict the future and do not adequately explain current states of affairs (ibid.). Piketty (2014), for instance, claims that relying too much on these models has led economists to side-line important issues such as the distribution of wealth.

Mainstream economists believe that the coherent purposes and reliable calculations of the consequences of action behind these models are "the magic keys which unlock the secrets of human behaviour" (Skidelsky, 2020, p.x). Economics has become the "the mathematical and statistical analysis of production and consumption" (Spotton Visano, 2019, p.325), "wrapped in a cloak of technical analysis" (ibid., p. 324). The picture of human motives developed by mainstream economists is incomplete. Their models tend to fail to predict outcomes accurately. They ignore all the motives for choice and action which fall outside the behaviour they have set up in their models (Brant, 2011, 2015; Brant and Panjwani, 2015; Lawson, 1997; Piketty, 2014; Skidelsky, 2020).

The conception of the 'economic man' or 'homo economicus', "whose activities are determined solely by the desire for wealth" (Keynes, 1917, p.14), underpins the models of mainstream economics. S/he acts purposively and calculates the most efficient means to achieve his/her coherent plans. This individual is regarded to respond to interventions in a predictable way. It is my argument throughout that this is not the case.

2.1.4 Methodological inconsistency

The roots of the problems faced by economics lie deep within the way the discipline proceeds (e.g., Fine, 2010; Lawson, 1997; Skidelsky, 2020). Without much explicit or cogent argument, orthodox economists "usually scorn the study of methodology"

(Lawson, 1997, p.2). Blaug (1992), for instance, maintains that “economic methodology has little place in the training of modern economists” (p.xxvii). Economists tend to emphasise ‘what to think’ instead of ‘how to think’ (Skidelsky, 2020). They assume that social reality must fit in whichever method is employed.

Economic models assume that people are behaving rationally, even though the results may turn out to be far from what economists expect (Chang, 2014; Pikettty, 2014; Skidelsky, 2020). They are supposed to be closely related to the real world and to offer reliable knowledge of what is going on. But one may ask: “Has the argument excluded parts of reality which are important to understanding what might happen?” Lawson (1997) argues that

> the fiction of atomistic, quasiomniscient, infallible (‘economically rational’) agents acting in the closed, isolated conditions described in contemporary modelling, does indeed constitute such a different world, one hopelessly irrelevant for providing insight into our own. (p.236)

Mainstream economics is accused not of “false reasoning, but of reasoning from over-simple premises” (ibid., p.5). One such instance is when results are “forced into the ‘whenever this then that’ form” (ibid., p.65). Skidelsky (2020) maintains that this method of stating a hypothesis in a very simple form and then relaxing the assumptions to bring it into closer touch with reality exerts a gravitational pull towards over-simple reasoning. He calls this as the caricature which rules the textbooks. Similarly, Lawson (1997) criticises “the widespread and rather uncritical application of formalistic methods and systems to conditions for which they were obviously quite unsuited” (p.xiii). He argues that

> the theory upon which most econometric analyses are based presupposes the existence of stable parameter relations. But the observed practices of econometricians indicate that the models actually derived are not sufficiently stable to allow the successful forecasting of events occurring outside the period for which the models were initially constructed. (p.71)

A major cause of this methodological inconsistency is “the unquestioning, uncritical, orthodox adherence to the deductivist mode of reasoning” (ibid., p.133). Laws are formulated in terms of constant conjunctions of events or states of affairs of the form ‘whenever event x then event y’. Deductivism constitutes an almost universally applicable mode of economic explanation (e.g., Lawson, 1997; Skidelsky, 2020), facilitating a predictive economic science (Robbins, 1984). I concur with Lawson

(1997) and Skidelsky (2020) that economics needs to abandon this unrealistic attempt to construct a set of universal laws applicable to all situations and problems.

Another issue is methodological individualism. Mainstream economics perceives social phenomena as the summed-up behaviour of individuals (Chang, 2014; Skidelsky, 2020). The only recognised agents are persons, which include households and small firms, but not organisations or social classes. As a result, individualist economic theories misrepresent the reality of economic decision-making (Chang, 2014). Individual choices and decisions are considered to be independent and specific to those making them. These claims enable economists to conclude that aggregate outcomes are the result of many rational choices taken by isolated individuals. Skidelsky (2020) contends that economists should abandon this attempt to 'microfound' macroeconomics (ibid., p.xiv). It is only when economists consider "the multi-faceted and limited nature of individuals while recognizing the importance of large organizations with complex structure and internal decision mechanisms" that they will be able to propose theories that help us "to understand the complexity of choices in real-world economies" (Chang, 2014, p.200).

Since economists are unable to validate their most important hypotheses empirically, they strongly tend to slide into ideology (Lawson, 1997; Piketty, 2014; Skidelsky, 2020). For example, the strength of Piketty's argument in putting the issue of distribution back into economics is that his debate over inequality is grounded in strong empirical data through analysing the historic trends of wealth and income of twenty countries.

2.1.5 Insensitivity to the context of an open system

Orthodox economics needs to cultivate a greater sensitivity to the social and political context (Lawson, 1997; Piketty, 2014). It perseveres stubbornly into proceeding with a positivist methodology, "including most fundamentally of all an uncritical insistence upon wielding methods that presuppose a closure, in a forlorn attempt to illuminate" an open social system (Lawson, 1997, p.154). Economics needs to be perceived as part of an open system with a multiplicity of mechanisms, structures and agencies in play (Anderson, 2021; Bhaskar, 2017; Brant and Panjwani, 2015; Lawson, 1997). Social phenomena are generated in such an open system, which is in stark contrast to viewing the world in terms of closed systems, with an overuse of the term 'ceteris

paribus'. Alderson (2021) avers that "unlike particles, people are complex and unpredictable. They are entangled within interacting social contexts, relationships and needs, which may not be unravelled usefully into separate variables" (p.3).

Mainstream economists 'convert' open systems into closed systems by excluding changes that might destabilise the model under consideration. In so doing, they become insensitive to the social context. For instance, they reduce social structures to economic transactions and may erect one aspect of human behaviour, such as the calculation of costs, into a universal law of all human behaviour. This method of "freezing the frame" and including in it only measurable moves might work well when analysing individual markets or firms but may break down when applied to the whole economy (Skidelsky, 2020).

Economists tend to treat the economy as the sum of individual choices. Consequently, they fail to perceive the nature of the social world (Bhaskar, 2017; Brant and Panjwani, 2015; Skidelsky, 2020). They perceive individuals as choosing in isolation; "as a result they have paid scant attention to the 'sociology of knowledge' – the part played by society in structuring the knowledge on which individuals act" (Skidelsky, 2020, p.9). Economists, for instance, might not take into consideration the role of power in shaping economic relations, real-world structures, widespread wars, famines and other miseries, and social decline.

The presumption is that the methods of economic analysis can be fashioned without explicit regard to the nature of social phenomena. Consequently, social reality might be neglected (Brant, 2015; Brant and Panjwani, 2015; Lawson, 1997; Piketty, 2014). I contend that economics should be contextualised socially, historically and politically.

2.1.6 Is economics value-neutral?

Values such as love, justice, pity, courage, honour, loyalty, ambition, and public service tend to be unconsidered in the hypothesis of neoclassical economists (Aldred, 2009, 2019; Brant, 2011; Chang, 2014; Fine, 2010). Mainstream economists economists maintain that moral questions "are above their pay grade ... but this is only because they have defined their subject in a way that deliberately excludes them" (Skidelsky, 2020, pp.13-14). Chang (2014) cautions that one "should never believe any economist who claims to offer 'scientific', value-free analysis" (p.452). They may ignore, for instance, the reality of firms who use their resources to support social

causes or forgo lines of business that might generate negative societal consequences (Chang, 2014; Krueger, 2019).

Many tend to equate the underlying motivation of economic life with greed and the blind pursuit of money (Noguera-Méndez and Cifuentes-Faura, 2022). The early great economists would despise this opinion that economics deals solely with material wealth and prosperity. Economics, which was once rooted in moral philosophy, gradually detached itself from moral concerns in the twentieth century as it aspired to become a pure science. This tendency was part of a more general movement whereby different traditions of studying society sought to emulate the natural sciences. Neoclassical economics became individualistic, shorn of political and ethical dimensions that involve subjective value judgements. Homo economicus started to be envisaged as pursuing solely his/her self-interest and abstaining from social relations. He is a "rather one-dimensional being – a 'pleasure machine', as he was called, devoted to the maximisation of pleasure (utility) and the minimisation of pain (disutility), usually in narrowly defined material terms" (Chang, 2014, p.121).

Economists stopped considering questions such as, "What is the purpose of profit maximisation and efficiency of the market? Who is benefiting from economic growth? What is the goal of the growth in wealth?" They assumed, for instance, that the market effectively coordinates complex economic activities. They tended to forget that "it is no more than that – a mechanism, a machine. And like all machines, it needs careful regulation and steering" (Chang, 2011, p.253). Krueger (2019) argues that one cannot "understand markets or the economy without recognizing when and how the jazz of emotions, psychology, and social relations interfere with the invisible hands of supply and demand" (p.6). He mentions the example of musicians who, out of sheer concern for fairness towards their fans, sacrifice their profits by underpricing their concert tickets relative to the price that supply and demand dictate. They might consider it in their own interest "to sacrifice short-term revenue for the sake of long-term longevity and popularity" (p.138).

I argue that economics needs to strengthen its moral and social dimensions. It needs to consider more the idea of a compassionate human being who "operates on a level of values and who cares about other human beings, human justice and the environment" (Brant, 2015, p.14). After all, these were the sentiments of the early great economists. Adam Smith, for instance, claimed that human nature is simultaneously

self-regarding and other-regarding. He maintained that persons are endowed with a natural tendency to care about the well-being of others, which he calls ‘sympathy’, defining it as “our fellow-feeling for the misery of others” (Smith, 1776, p.10). He contended that a society cannot prosper if it includes a large number of persons who are poor and suffering. Keynes (1931) shared similar concerns. In ‘Economic possibilities for our grandchildren’, he described the “love of money as a possession” as “a somewhat disgusting morbidity, one of those semi-criminal, semi-pathological propensities which one hands over with a shudder to the specialists in mental disease” (p.369). He predicted increasing average income per head in the early twenty-first century, anticipated the problems of affluenza, and argued in favour of the importance of an ethical framework once society ceased to be focused solely on economic growth.

Another argument is that both teachers and students bring along with them value positions to the economics lesson. These need to be acknowledged and made explicit so that everyone can reflect on them (Brant, 2011). It is therefore “intellectually dishonest” to hide “behind the pretext of neutrality and propagate economics as a value-free discipline” (ibid., p.125). Economics education is about empowering students to think critically about their position and that of others and make good decisions. This implies an ethical or moral perspective (Aldred, 2009; Brant, 2011; Ellington, 2021).

2.1.7 Human free will is not considered

Since the positivist conception of science is uncritically accepted in much of mainstream economics, so the associated specification of homo economicus as the passive receptor of events goes relatively unchallenged. Economics does not meaningfully accommodate within its theories and models the reality of human choice, perceiving persons as merely passive who cannot exercise real choice and imagination (e.g., Chang, 2011, 2014; Lawson, 1997).

The conception that emerges is one wherein human beings are unable to contribute to the active making of their own history. Mainstream economics has a tendency “to characterise human agents as passive automata, propelled along under the influence only of external forces” (Lawson, 1997, p.10). This exercise of choice is a phenomenon that is absent from the models presented by mainstream economists. Individuals are represented in such a way that they almost always follow one rational course of action

and are unable to act in a different way than as predicted by the economic model under consideration. Orthodox economists 'forget' that persons do attempt, and often succeed, to change their living conditions by imagining a utopia, persuading others and organising society differently.

Since choice and change are "rendered little more than illusory", the practice of policy formulation is "rendered pointless" (Lawson, 1997, p.277). What is required for policy analysis and action is not the illumination or prediction of events but the identification and understanding of the structures, powers, mechanisms and tendencies which produce or facilitate them. Event prediction might be misleading and not desirable. Lawson (1997) argues that

> [f]or the possibility of successful prediction, turning as it does on the existence of constant conjunctions of events, would mean either that the future is already determined, or, if exogenous variables could be fixed by us, open to social control. Either way the situation would be inconsistent with the possibility of generalised human choice and freedom. (p.289)

2.1.8 Economics and neoliberalism

Since economics is dominated by neoclassical content, the discipline implicates the internalisation of neoliberal logic (Brant and Panjwani, 2015; Fine, 2010; Spotton Visano, 2018, 2019). Spotton Visano (2019) claims that economics as taught in universities has become "both an apologist for capitalism and the engine of neoliberalism" (p.321).

The dominant pedagogy of 'lecturing' economics serves to reinforce the authority of neoliberalism (Spotton Visano, 2018, 2019). Teaching approaches, instead of more engaging student-centred teaching and learning, "continue to be dominated by the 'sage on stage' authority lecturing in 'chalk-and-talk' style on an ideologically narrow conception of economics" (Spotton Visano, 2019, p.324).

2.2 The Maltese secondary school economics curriculum

As is the situation in other countries (Brant, 2011, 2015), the current Maltese secondary school economics curriculum implicitly accepts neoclassical theory and a positivistic methodology[1]. It includes neoclassical content such as scarcity, choice,

[1] A new secondary school economics syllabus designed using *The Learning Outcomes Framework* will start to be implemented as from Year 9 of scholastic year 2022-2023:

opportunity cost, wage determination, inflation and circular flow of income. This economics content offers “a simpler version of university economics” (Brant and Panjwani, 2015, p.320), predominantly embracing a positivistic methodology (Brant, 2011, 2015; Brant and Panjwani, 2015; Livesey, 1986; Spotton Visano, 2018, 2019) and reinforcing a paradigm which tends to assume the status of being ‘natural’. The language of economics, such as the ‘invisible hand’ and ‘equilibrium’, consolidates this conception.

The syllabus aims to provide an understanding of the basic economic concepts, theories and principles with particular reference to the basic economic indicators of the Maltese Islands such as national income, inflation, unemployment, and balance of payments; preparing students “for effective participation in society as citizens, producers and consumers”; and developing “candidates’ personal effectiveness through an understanding of contemporary economic issues” (Economics SEC 2021 Syllabus, p.2). The last two aims do imply some requirement of criticality. The syllabus however falls short in explaining how this can be achieved. Teachers have therefore the space to be creative in educating their students in these aspects.

There is evidence of a strong element of deductivism, a characteristic of the positivist method. The first assessment objective expects students to “demonstrate a knowledge and an understanding of economic concepts, theories and principles” (ibid., p.2). The second one expects them to apply economic principles, concepts and theories to particular situations, while the third objective invites learners to “carry out simple analysis of economic problems employing the appropriate economic principles, theories and concepts” (ibid.). Since they expect students to apply theories to particular situations, I contend that the second and third objectives tend to foster the deductive mode of reasoning. There is no reference to the explanatory function of economics as enabling students to better understand the economic scenario around them.

This curriculum does not encourage a critique of theory or provide the scope to explore alternative conceptualisations. One such example is the section dealing with the determination of price in market economies. This requires students to construct

https://www.um.edu.mt/__data/assets/pdf_file/0018/470340/SEC10EconomicsSyllabus2025.pdf [Accessed on 26/05/2022]

demand and supply curves and distinguish between a movement along and shift of the demand and/or supply curve, understand the market forces that determine equilibrium, explain the impact of government intervention, show an understanding of the application of price mechanism on different issues such as property market, agricultural market, labour and exchange rate market, and explain the reasons for and effects of price control. Teachers might take this economics content as given, accept theories as facts and teach them that way (Brant, 2011; Brant and Panjwani, 2015; Spotton Visano, 2018, 2019). It might encourage teachers, for instance, to promulgate the ubiquity of the market without being critical of its workings.

I encounter this curriculum as cold, individualistic and lacking a social context. It assumes the neoclassical, rational behaviour of homo economicus who "is purported to behave selfishly and in pursuit of self-interest" (Brant, 2015, p.11). There is no reference throughout, for instance, to persons and organisations following human and compassionate values and behaving ethically.

The economics content is not situated in a historical context. There is no reference to a brief overview of the history of economic thought, such as reference to ideas contributed by Adam Smith, Karl Marx and Joseph Schumpeter; their writings are very often outside the standard curriculum (Brant and Panjwani, 2015; Skidelsky, 2020). A brief exploration of their ideas can provide students with a glimpse that there are approaches to economics other than the dominant neoclassical approach of a market economy dominated by neoclassical models.

This curriculum presents teachers with the opportunity to discuss economics content with particular reference to their students' lives and the real-world scenario. It does attempt to foster in students the argumentative aspect of economics. It spells out that "[c]andidates are encouraged to express and present information, ideas, descriptions, diagrams and arguments clearly" (ibid.). Most importantly, the scheme of assessment attempts to give examiners the direction to contextualise questions in the local, national and international contexts and not abstracted from the real world: "Questions will be based upon various forms of data, including extracts, tabulated schedules and graphical representations. Data will be extracted from real-world sources and/or simulated" (ibid., p.3). The syllabus suggests that pedagogy follows suit in that teachers are "recommended that concepts and theories are applied to real economic situations" (ibid.). So while having to teach a strong neoclassical syllabus, teachers

are urged to ground economics in the real world. This situation is similar to the English situation where there is “a requirement to contextualise economics in the real world in local, national and international contexts” (Brant, 2015, p.15). I argue that this is a golden opportunity for teachers that instead of grounding economics in abstracted a priori models, they start off their lessons from real-world data and the students’ experiences and then proceed to present economic models as assisting students into understanding better the world around them. In this way, teachers can teach economic models and theories more critically, with the possibility of exploring alternative conceptualisations. Economics learning becomes then more relevant and interesting for young learners, in contrast to the unfortunate reputation it has earned as the “dismal science” coined by Friedman (1953, p.30).

2.3 An alternative conceptualisation for economics

The repeated explanatory and predictive failures and anomalies of orthodox economics have led to debates that consider potentially fruitful, alternative ways forward. It is suggested that the discipline can be conceptualised in a broader way than employing a neoclassical approach underpinned by positivist theory (Brant, 2011, 2015; Brant and Panjwani, 2015; Lawson, 1997; Skidelsky, 2020). Whilst abandoning its attempt to construct a set of universal laws applicable to all situations and problems, the subject can instead be perceived as providing an explanatory function to help young people understand better important aspects of the world in which they live (Brant, 2011, 2015; Brant and Panjwani, 2015; Spotton Visano, 2019). Such an approach does “hold the advantage of avoiding the anomalies of the mainstream project” (Lawson, 1997, p.42).

Economics should seek alternative conceptual frameworks other than the positivistic methodology, “ones that are good at understanding and addressing real problems” (Brant, 2011, p.120). Lawson (1997) contends that the way forward

> is to abandon the whole misleading positivistic perspective and its results. It is time to fashion an alternative that recognises the reality of an open social system. It is opportune to develop a perspective on the way that social reality is, rather than merely to assume under the sway of the epistemic fallacy that it must conform to the sort of a priori, typically formalistic, methods of which economists are currently, if largely unthinkingly, enamoured. (p.154)

2.3.1 Economics as a social science

Within the proposed paradigm for economics and economics education, the discipline is perceived "as a social science, concerned with understanding the often conflicting values, interests, and capacities of large numbers of individuals operating within the constraints of limited resources" (Brant, 2015, p.7). The subject could then be "taught as a social science with an emphasis on its explanatory function" (Brant and Panjwani, 2015, p.322).

Economics is inherently a social subject; the functioning of the economy is of interest to everyone: how it operates, how well it functions and in whose interests it functions (e.g., Spotton Visano, 2019). It is by following this approach that the noted problems of the discipline can be addressed. This also ushers in the possibility of economics being open to other social sciences and potentially collaborating with them (Brant and Panjwani, 2015; Chang, 2014; Skidelsky, 2020).

Adopting critical realism as a paradigm for economics assists the discipline in its move towards becoming a social science. Bhaskar (2017) claims that critical realism hopes to give a better account of social science and of the world it studies; this would enhance economists' reflexivity and facilitate the transformation of their practice.

2.3.2 Critical realism – An alternative framework for framing economic problems

Critical realism provides a better ontological, epistemological and methodological underpinning to the discipline of economics than positivism (Brant, 2011, 2015; Brant and Panjwani, 2015; Durden, 2016; Lawson, 1997; Vincent and O'Mahoney, 2018). This philosophy assumes that the world "is not immediately apparent" (Bhaskar, 2017, p.17) and that reality exists independently of our human perceptions. Our knowledge of it is always contingent, subject to development, and based on informed judgement and not on absolute proof.

The conception embraced by a critical realist is of a world that is complexly structured, open, intrinsically dynamic, and characterised by emergence and novelty (Anderson, 2021; Bhaskar, 1979, 2017; Lawson, 1997). This ontology is deeper and richer when compared to that presupposed by the scientific paradigm which informs orthodox economics (ibid.). Lawson (1997) explains how the way orthodox economics proceeds flattens "a rich complex panorama onto a single plane, a set of lines" (p.65):

> Thus, in contemporary economics the (usually implicit) social landscape is marked by determinism instead of transformative intentional agency, stasis rather than change, extensionalism (formulated by Hume as the doctrine that events are everywhere 'loose and separate, conjoined but never connected') rather than internal-relationality, actualism rather than openness, depth and emergence, and monovalence to the exclusion of negativity. (p.65)

Bhaskar (2017) proposes the 'holy trinity' of critical realism, involving the compatibility of ontological realism, epistemological relativity and judgemental rationality. Ontological realism refers to the dimension of intransitive objects of knowledge which exist and also act in an independent manner from our theories about them, the transitive space. Epistemological relativity discusses the idea that beliefs are socially produced and fallible; they are the products of society. This implies that all knowledge and our criteria for truth and values are not externally situated from our particular historical time and can change through time. Epistemic relativity also includes fallibilism, the idea that our beliefs may turn out to be false. Judgemental rationality argues that even though our knowledge is relative, individuals can propose strong arguments for preferring one set of beliefs and theories about the world to another.

A critical realist perceives the world as an open system (e.g., Anderson, 2021; Bhaskar, 2017), excluding the possibility of constant conjunctions of events. These are only possible in the closed systems, especially in the experimentally closed ones. A critical realist views the world as consisting in more than the actual course of events and the human experiences. Reality is viewed as stratified and three domains of reality are distinguished (Bhaskar, 1979, 2017). These are the empirical (human sensory experiences and perceptions), the actual (events that occur in space and time, which might be different to what we perceive to be the case), and the real (structures, powers, mechanisms and tendencies which generate and explain events). These three domains are ontologically distinct and irreducible. For instance, the real cannot be reduced to the actual nor the latter identified with the empirical. Their characteristic components (mechanisms, events and experiences) are unsynchronised or out of phase with one another. To exemplify the independence of events and experience, one can observe how different persons following a particular game experience the same event (for example, a goal or a particular accident) somewhat differently, just as a particular individual may experience an already observed event differently when later s/he views a recording of that same event. Thus, experience is unsynchronised with

events, allowing for the possibility of contrasting experiences of a given event. Similarly, events are typically out of phase with the mechanisms that govern them.

Another important aspect is that critical realism explores the structures, powers, generative mechanisms and tendencies that contribute to the production of some identified phenomenon of interest (Bhaskar, 1979, 2017). Structures have the capacities or potential to act in a certain way, mechanisms are the way structured things operate, and tendencies are potentials and forces actually in operation. These structures and mechanisms exist and act independently of the patterns of events they govern.

Critical realism recommends following a retroductive approach to understand a particular phenomenon. This involves proceeding from the knowledge of the phenomenon existing at any one level of reality, to a knowledge of mechanisms at a deeper level of reality, which contributed to the generation of the original phenomenon of interest (Bhaskar, 1979, 2017). In this way, these mechanisms shed light upon the concrete phenomenon observed. Our primary concern is not to produce a repetition or a confirmation or a falsification of our experience, but to understand the causes of our experience or of the events that we perceive in the world. It is moving from a level of reality that we do understand to the level of what explains them, which at any moment of time we do not understand (Bhaskar, 2017). If, for instance, one tries to explain an economic phenomenon, a hypothesis of mechanism needs to be determined.

Bhaskar (1979, 2017) proposes following a ‘DREIC’ model of enquiry when trying to understand a phenomenon. The first step is ‘Description’, where one describes the phenomena as accurately as possible. In the ‘Retroductive’ moment, one imagines a mechanism or structure, which, if it were true, would explain the event or regularity in question. Since one can posit a number of explanatory mechanisms or structures, the third task is to ‘Eliminate’ those which are false and consequently ‘Identify’ the ones that seem to genuinely explain the phenomenon. The final level is where ‘Corrections’ are made and the phenomenon is examined again to see if the explanatory mechanism has been best identified. When the generative mechanism or structure at work has been identified, one asks again, “Why does that happen? Why is the world that way?” This moves the critical realist on to a new cycle of scientific discovery and development, a repeated DREIC. This DREIC approach applied to economics offers

the subject a powerful explanatory function in contrast to the dubious claims of accurate predictions (Brant, 2011, 2015).

Critical realism provides for a scenario where human choice and emancipation are sustained. A positivistic view of science attempts to control and improve events and states of affairs. A critical realist perspective instead offers human emancipation through structural transformation, transforming real social structures in order to facilitate alternative opportunities (Anderson, 2021; Bhaskar, 1979, 2017; Lawson, 1997). There arises the possibility of enhancing the scope for broadening human opportunities. It becomes possible to reflect about creating structures that are wanted and empowering and replacing others which are unneeded and restrictive. Choice is no longer denied. On the contrary, it lies within the realms of policy objectives to aim to widen the scope of choice, in particular with respect to options that are both needed and desired. Critical realism "promotes habits of critical thinking that can help to increase everyone's scientific and political literacy and judgement" (Anderson, 2021, p.4). Lawson (1997) maintains that "emancipatory, real change is no longer found to be, as in positivism, in contradiction with the explanatory function of science including economics ..." (p.289).

By embracing a critical realist philosophy, one is empowered with new insights for thinking about economics (Brant, 2011, 2015; Brant and Panjwani, 2015; Vincent and O'Mahoney, 2018). Nourishing insights are generated, for instance, when viewing the discipline as a social science involving social structures and human agency. Bhaskar (2017) maintains that a structure is always necessary for agency, and at the same time, agency reproduces or transforms structure. He also argues about the existence of 'laminated systems' (ibid.). These are composed of different levels, reference to each of which is necessary in order to understand or give an adequate account of the phenomena under consideration. Examples include the British legal system, the Maltese public sector or financialised capitalism: "whilst these cannot be separated from the rest of society, they comprise systems, mechanisms and entities which can be usefully considered and conceptualised together" (Vincent and O'Mahoney, 2018, p.203). One form of laminated system is the notion of the four-planer social being (Bhaskar, 2017). Bhaskar (1979, 2017) claims that every social event occurs in at least four dimensions: material transactions with nature, social interactions between humans, social structure that cannot be reduced to agency, and the plane of the

stratification of the embodied personality. These four planes constitute a necessarily laminated system of their own in that referring to any one level will also necessarily involve reference to the others.

2.4 Insights for pedagogy

This section discusses pedagogical implications arising from teachers' attempts to challenge outdated theory and adopting an alternative conceptualisation for economics. A more rewarding teaching and learning journey is experienced where students understand more deeply and, as a result, their attainment in examinations improves.

2.4.1 Being aware of the grip of neoclassical economics

Teachers may be "steeped in their own neoclassical experience of economics" (Spotton Visano, 2019, p.333). The first move in freeing themselves out of this grip is to be aware of it, of "being forced into some procrustean, mathematically defined framework – free-market liberalism" (Ranson and Baird, 2009, p.8), and how it is affecting their approach towards teaching economics. Teachers are urged to follow Chang's (2011) advice to empower themselves and their students into thinking critically and remove the "glasses that neo-liberal ideologies like you to wear every day. The glasses make the world look simple and pretty. But lift them off and stare at the clear harsh light of reality" (p.xvi). One then hopes, for instance, that by incorporating into lessons their own experiences such as those relating to their choices as consumers, teachers can become increasingly more aware of this grip of neoclassical economics and students recognise that neoclassical economics has no right to claim unique expertise.

Another suggestion is for teachers to be aware of and explore the nature of the economics content present in the proposed curriculum and textbooks. Is it portrayed that there is only one right way of 'doing economics', that is the neoclassical approach, as most economics books assume (e.g., Brant and Panjwani, 2015; Chang, 2014)? In the worst scenario, textbooks would not even explain that there exist other schools of economics other than the neoclassical one. Grant (2006), for instance, while suggesting a variety of useful strategies to promote active learning in economics, fails to urge teachers to explore their own conceptions vis-à-vis the discipline and to explore

whether neoclassical economics is the dominant paradigm being presented in the syllabus they have to follow.

2.4.2 Economics as part of an open system

Teachers who adopt the proposed ontological perspective view economics as part of an open system; the real world is perceived as complex and involving a multiplicity of mechanisms, structures and agencies (Bhaskar, 2017; Brant and Panjwani, 2015; Lawson, 1997). Teachers empower their students to perceive economics as a social science which is embedded in the social system and not isolated from society (Brant, 2011, 2015; Brant and Panjwani, 2015).

Teachers need also to educate their students into perceiving economics as open to other social sciences such as history and politics (Bhaskar, 2017; Piketty, 2014; Skidelsky, 2020). They need to attempt to "incorporate historical, social and political contexts to facilitate meaningful understanding of complex economic topics" (Brant and Panjwani, 2015, p.319). Bhaskar (2017) claims that a problem of economics as a science is that of appearing being "closed to other sciences, other social sciences" (p.46). Piketty (2014) bluntly argues that economists "are all too often preoccupied with petty mathematical problems of interest only to themselves" (p.41). The discipline needs to "to get over its childish passion for mathematics and for purely theoretical and often highly ideological speculation" and collaborate with the other social sciences (ibid). He claims that "economics should never have sought to divorce itself from the other social sciences and can advance only in conjunction with them" (ibid), by collaboratively taking "a pragmatic approach and avail ourselves of the methods of historians, sociologists, and political scientists as well as economists" (ibid., p.33).

2.4.3 Models as explanatory devices

This approach towards teaching and learning economics implies that teachers educate their students into perceiving economic models not as entities in themselves but as tools in helping them to critically explore, understand and explain reality better. Such a pedagogic approach helps teachers and students "to reclaim reality from abstract models" (Brant and Panjwani, 2015, p.318) with discussions and assessments contextualised with relevant examples from the real world and the students' life. The role of the teacher is not to approach reality with a priori theories to explicate the

practice taking place but to explore and understand how the theoretical elements are manifest in reality (Brant, 2015; Brant and Panjwani, 2015; Spotton Visano, 2019).

Students need to be enabled to critically engage with these models and perceive them as representing the unseen forces and mechanisms at work (Brant, 2011, 2015; Skidelsky, 2020). These "should not be taught as if they are real in themselves" (Brant, 2015, p.14) but as explanatory tools. One such example is the supply and demand model. It assists students to understand the forces of demand and supply which influence prices and the decisions of firms.

2.4.4 Exploring reality

Teachers and students adopt the approach of exploring reality and then use economic theory as an explanatory tool to comprehend more deeply the forces and tendencies at work in the economy. Theories are not taught as facts that need to be accepted but as tools for understanding.

Starting from real-world evidence keeps "economics fresh and relevant" (Brant, 2015, p.13), as exemplified by Piketty's (2014) research. Krueger (2019) contends that having done extensive field research, he feels that he has "developed a richer, more reliable, and more representative picture of how economic forces shape the music industry" (p.4). Along these lines, teachers get their students to discuss possible explanations of a phenomenon and then "argue for the 'best' explanatory mechanism" (Brant 2011, p.126). This retroductive approach to learning economics develops students' understandings of the subject and they are able to propose sound explanations (ibid.).

This is in line with Kolb's (1984) learning cycle of starting off from what is known and concrete and then proceed to the abstract. Teachers draw upon their students' experiences and foster dialogue, discussions and activities that promote active economics learning (Becker and Watts, 1998; Becker, Watts and Becker, 2006; Brant, 2015; Davies and Brant, 2006; Grant, 2006; Hoyt and McGoldrick, 2012; Sober-Giecek, 2000; Whitehead, 1979; Whitehead and Dyer, 1991). They ask themselves: "What experiences do the students have that are relevant to the topic I am about to teach?" (Davies and Brant, 2006, p.160). Economics becomes then contextualised in the students' life experience and in the local, national and international contexts. Learning the subject becomes more interesting and relevant, especially if teachers do

their best to adopt an interactive pedagogy (e.g., Atkinson, 1989; Becker and Watts, 1998; Becker, Watts and Becker, 2006; Grant, 2006; Hall and Lawson, 2019; Hodkinson and Whitehead, 1986; Hoyt and McGoldrick, 2012; Mixon and Cebula, 2012; Stobart, 2014). It would be unfortunate if economics teaching is "based on textbook theory and not real life, and teachers have continued as if nothing has happened" (Brant, 2011, p.122). Davies and Brant (2006) draw the attention that another step towards deep learning is then required:

> Good teaching is not simply a matter of 'building on' these prior perceptions because new ideas must be embedded in students' thinking if they are to become part of the way they see the world. This may require getting students to recognise the limitations of their current thinking and enabling them to develop a different view that replaces what was there before. (p.176)

Teachers need also to educate their young learners to be critical of out-dated theory and static neoclassical economic models. They need to be made aware of and challenge this 'zombieconomics' (Fine, 2010), that is, approaches and content which are dead and discredited in the academic discipline yet still "undead" in the discipline itself and in the school curriculum, "blundering around looking for applications ... in the dimly incorporated real world" (ibid., p.167).

2.4.5 Adopting a pluralist approach

Since school economics tends to be dominated by one particular understanding of economics, students are rarely exposed to other conceptualisations and to a critique of the dominant paradigm (Brant, 2015; Brant and Panjwani, 2015; Chang, 2011, 2014; Dow, 2009; Modig, 2021; Spotton Visano, 2019). The matter is made worse by the "imperious tone" of mainstream economics which makes persons feel that "they are being told what to think, rather than encouraged to understand" (Aldred, 2009, p.4). I therefore concur with Dow (2009) that "students should be exposed to a range of approaches" (p.41). Teachers need to discuss with their students that "there isn't just one right way of 'doing' economics, despite what most economists tell you ... The economic reality is complex and cannot be fully analysed with just one theory" (Chang, 2014, pp.452-453). Once making them aware that different approaches emphasise different aspects and offer different perspectives, teachers strive to make their students aware of the different schools of economic thought, believing that this empowers them "to have a fuller, more balanced understanding of the complex entity called the economy" (ibid., p.161). This fosters cross-fertilisation, in that "[d]ifferent

approaches to economics can actually benefit a lot from learning from each other, making our understanding of the economic world richer" (ibid., p.162).

A classroom environment dominated by neoclassical economics "serves less to promote 'thinking' - as an independent reflective and reasoned process – and more to persuade students of the benefits of the market and individual choice" (Spotton Visano, 2019, p.325). I argue that students must be involved in critical economics thinking. They need to be encouraged to become "aware of different types of economic arguments and develop the critical faculty to judge which argument makes most sense in a given economic circumstance" (Chang, 2014, p.5). In this way, teachers would be contributing towards returning pluralism to the secondary school economics classroom "in a way that encourages students' appreciation of a richer set of perspectives on our material relations" (Spotton Visano, 2019, p.323).

Teachers who commit themselves to this pluralist approach to economics teaching make explicit the methodological assumptions of the economics they teach. They do this by including in their economics content an overview of the history of economic thought and progressively encourage critical reflection on the conceptualisations involved (Brant, 2015; Dow, 2009; Skidelsky, 2020). Students are urged to understand the motivation of those who developed the notions involved and the context in which these ideas were conceived and developed (Brant, 2015; Chang, 2014; Dow, 2009), because "[h]owever great an economic theory may be, it is specific to its time and space" (Chang, 2014, p.43). Dow (2009) argues that "a pluralist education needs to incorporate methodological and historical material to raise awareness first, and equip students with the necessary analytical tools second" (p.42).

Spotton Visano (2019) draws the attention that "[m]aintaining conventional pedagogy while attempting to reinvigorate pluralism in economics classrooms may run at cross purposes" (p.324). Pedagogical pluralism is also needed. It is unfortunate that despite efforts to broaden the pedagogical practices in economics, university economics education remains characterised by the pervasiveness of passive learning through the vehicle of a lecture-based teaching approach covering traditional content (Spotton Visano, 2018, 2019). This author warns that encouraging students to reflect upon "a broader range of alternative economic perspectives but adhering to a classroom focused on the dominance of the teacher as a single authoritarian voice risks contradicting the importance of pluralistic content" (Spotton Visano, 2019, p.327).

Such content pluralism promulgated “by an authoritative lecturer replicates in the classroom the very power relations that permitted the neoclassical hegemony in the first place” (ibid., p.328). It is when pluralist content is coupled with a pluralist pedagogy that students can be equipped with “the knowledge to exercise their own judgment as future economists and the confidence to challenge the dominant disciplinary monism” (ibid., p.326).

2.4.6 Developing criticality of thought

By considering different economic approaches and schools of thought, the economics teacher attempts to enact learning around a diversified economics course content by exploring pedagogical practices that encourage discussions and debates over a more broadly informed range of perspectives on the economy, with no one school of thought accorded blanket authority a priori. Students gradually mature into critiquing and debating existing theories, gaining insights, forming their own views and discovering other approaches which accord better with their own understandings of how the economy works (Brant, 2015; Brant and Panjwani, 2015; Chang, 2011, 2014; Dow, 2009; Jephcote, 2004; Spotton Visano, 2018, 2019).

This pedagogy in a heterodox economics classroom assists in “dislodging the dominance of neoclassical economics” (Spotton Visano, 2019, p.333) and animate pluralist content in economics education (Brant, 2015; Brant and Panjwani, 2015; Dow, 2009; Spotton Visano, 2018, 2019). A teacher who adopts such a pedagogy cultivates a classroom environment characterised by elements of critical pedagogy (Spotton Visano, 2018, 2019). These include educating students to engage in critical dialogue with economics knowledge, challenge what is often taken for granted, and question authority and power relations.

To achieve these ends, teachers need to explore pedagogical approaches that develop students’ ability to debate and become active participants in their own learning. Sober-Giecek (2000), for example, proposes lessons that attempt to foster critical dialogue and reflection about ethical issues in economics such as the distribution of wealth and income. Spotton Visano (2018) shares her own experience of designing a session where students are invited to work on a problem from first principles and proceed to a functional solution in the form of a financial contract between the parties involved. She remarks that some students may find it difficult to

adapt to such an approach, especially those who are accustomed to the single authoritarian voice of a neoclassical textbook. This reminds me of my advanced level course in economics which followed closely a textbook dominated by neoclassical content - Lipsey (1983, 1989).

A pluralist pedagogical approach proceeds beyond critical thinking out to an emancipatory pedagogy which cultivates a conscious awareness of and reflection on whose knowledge teachers and students are analysing. Students are empowered to develop a critical consciousness about the economics knowledge itself (Spotton Visano, 2018, 2019). Critical pedagogy inquires how and why economics knowledge gets moulded the way it does, and how and why some constructions of reality are legitimated by the dominant culture while others are not. It empowers students the rich benefits of thinking pluralistically about the economy, assisting them to understand the social context within which they can exercise their own judgment. Such a pedagogy enjoys the potential of raising student awareness of the many subtle ways in which a privileged perspective may come to dominate (ibid.).

2.4.7 Enhancing citizenship education and financial and economic literacies

Within this classroom environment, teachers educate their young learners for "an 'active economic citizenship' to demand the right courses of action from those in decision-making positions" (Chang, 2011, p.xvi). They make it clear that policy-makers and economists "do not have a monopoly on the truth, even when it comes to economic matters" (Chang, 2014, p.457). Citizenship education involves "exploring alternative perspectives and solutions, being aware of the implications of one choice over another and the consequential impacts of decision-making on people, communities, the economy and the environment" (Jephcote, 2005, p.50). It is closely connected with an understanding of economics because the subject "sets out to provide a way of evaluating policies and practice in terms of the overall public interest" (Davies and Brant, 2006, p.9), and empowers students to develop "an economic understanding of matters" (Jephcote, 2005, p.52) which enables them to discuss the impacts of decisions on communities and the economy. This is a particular contribution that economics teachers can make in bringing "to bear their skills in getting pupils to consider matters from a range of perspectives" (Jephcote, 2005, p.50).

Teachers gradually develop their students' confidence that it is possible for them to generate sound evaluations on economic issues based on their knowledge of key economic theories and understanding of underlying political, ethical and economic assumptions (Brant, 2018; Chang, 2014; Davies, 2015; Jephcote, 2005). Economics learning also empowers them to mature in economic and financial literacies (Brant, 2018; Brant and Cullimore, 2012; Chang, 2014; Davies, 2015; Davies and Brant, 2006). These cultivate financial and economic attitudes, skills and behaviours, and provide students access to the skills and confidence needed to enhance their financial and economic wellbeing (e.g., Björklund and Sandahl, 2021; Greimel-Fuhrmann, 2014; Greimel-Fuhrmann et al., 2016; Spotton Visano and Ek-Udofia, 2017; Sun et al., 2020).

Davies (2015) proposes a framework that suggests how important dimensions of financial literacy may be addressed in terms of the individual, the financial industry and the government. Concurring with Brant (2018), this author maintains that economics offers a knowledge base for "a systemic understanding at a personal, financial and governmental level" (Brant, 2018, p.21). The perspective adopted is that of economic literacy as an overarching construct of which financial literacy is one part, overlaps between the areas are welcomed to help students develop an overall understanding, and where "a citizenship objective for financial literacy is a necessary consequence of viewing school education as a servant of democratic development" (Davies, 2015, p.307).

2.4.8 Cultivating values

Whilst assisting their students into being critical about the purpose and ends of economics, teachers attempt to infuse ethical and moral values in their teaching so as to assist bringing back into economics its moral purpose (Brant, 2015; Brant and Panjwani, 2015; Chang, 2014; Ransom and Baird, 2009; Sober-Giecek, 2000). When evaluating an economic argument, students need to be invited, for instance, to analyse which moral values and political goals are involved.

Teachers enable their students to reflect that economics "should serve the needs of the people – not the other way around" (Ransom and Baird, 2009, p.8). A teacher's mission is therefore "to shift the focus back to where we think it belongs – the needs of people and the environment. The two cannot be easily separated; nor should they

be" (ibid., p.9). Hence the importance of such issues as sustainability, especially in the light of the United Nations (UN) sustainable development goals, and the distribution of wealth and income (Chang, 2014; Ransom and Baird, 2009; Sober-Giecek, 2000).

2.5 Conclusion

This chapter has argued for the importance of an alternative conceptualisation in the teaching and learning of economics as a means of overcoming the dominant messages of the neoclassical economics orthodoxy. Mainstream economists overemphasise the importance of mathematical methods and promulgate a strong methodological predisposition that focuses on competitive market processes for individual advantage to the exclusion of social processes for common benefit. Such an approach excludes important perspectives and hinders important debate.

Economists' ideological preference for neoclassical theory permeates also the school and higher education curriculum in economics. The Maltese secondary school economics curriculum is no exception. School economics tends to reproduce the status quo, especially if a teacher adopts a conventional pedagogy.

A critical realist framework provides for the possibility of an alternative paradigm in economics and economics education that can dislodge the dominance of neoclassical economics and assist into perceiving the discipline as a social science which provides an explanatory function to help students better understand and improve the world in which we live. This equips them with a wider knowledge of how we can organise material relations in our society and so challenge better the prevailing neoclassical economics ideology underpinning neoliberalism.

Insights and implications for pedagogy resulting from the adoption of this critical realist perspective have been discussed. These include the need to adopt a pluralist pedagogy supported by a pluralist economics curriculum so as to engage young learners in critical pedagogy in economics education. Other nourishing insights about how to enact this pedagogy are provided by the notions of threshold concepts, powerful knowledge and knowledge bases for teaching. These are explored in the following chapters.

3. Literature Review II: Threshold Concepts

Teachers often recall instances when their students felt ‘stuck’ at particular points in the curriculum (Meyer and Land, 2003, 2006). Why do learners experience difficulty in negotiating particular conceptual transitions (Land et al., 2016; Meyer and Land, 2003, 2006)? The proposal of Meyer and Land (2003, 2006) of a ‘threshold concepts’ approach to the curriculum linking the idea of threshold concepts with the notions of troublesome knowledge and liminality provides valuable insights.

3.1 The threshold concepts theory

The idea of threshold concepts arose in the context of studying lecturers’ accounts of students’ learning in higher education (Davies and Mangan, 2007; Meyer and Land, 2003, 2005). Since then, research into threshold concepts has been undertaken in a wide variety of disciplines revealing considerable interest from many researchers (e.g., Baille et al., 2013; Barradell, 2013; Davies, 2018; Davies and Brant, 2006; Hatt, 2018, 2019a, b, 2020, 2021a,b; Magdziarz, 2016; Meyer and Timmermans, 2016; Timmermans and Meyer, 2017; https://www.ee.ucl.ac.uk/~mflanaga/thresholds.html). This approach offers valuable insights into conceptual difficulty and student learning within various disciplines from different countries and institutional contexts (e.g., Meyer and Land, 2005, 2006; Bajada and Trayler, 2016; Hatt, 2021a,b; Land et al., 2016; Meyer and Timmermans, 2016; Timmermans and Meyer, 2017). It provides a construct that helps teachers understand how students travel along their learning journey to aid both teaching and student learning (Ashwin, 2015; Baille et al., 2013; Barradell, 2013); they “can help to define critical points in a students’ learning” (Baille et al., 2013, p.268). Threshold concepts have also helped “to redesign curricula with critical, transformational yet troublesome subject content in mind” (ibid., p.244).

Meyer and Land (2003, 2005, 2006) coined the notion of a threshold concept to refer to concepts in any discipline that, once grasped, open up a new and transformed way of understanding, interpreting or viewing a topic (Meyer and Land, 2003; Perkins, 1999, 2006; Shanahan et al., 2006). This has a transformative effect on internal views of subject matter, subject landscape, or even world view (Meyer and Land, 2003). ‘The world looks different’ when such thresholds have been crossed (Meyer and Land, 2006). Or it may be that one perceives features in a familiar landscape that were previously not discernable (ibid.). Such transformation may be sudden or it may be

protracted over a considerable period of time (Meyer and Land, 2003). These authors maintain that “such transformed understanding leads to a privileged or dominant view and therefore a contestable way of understanding something” (ibid., p.1). Examples mentioned by these authors include the concepts of opportunity cost from economics, limits and complex numbers for mathematics, and signification within literary and cultural studies. These concepts, if ‘accepted’ by the students as a valid way of interpreting the world, fundamentally change their way of thinking about themselves and the world around them (ibid.). This metaphor of a threshold concept represented by a portal or ‘space’ helps teachers to consider “how the portal initially comes ‘into view’, how it is approached, negotiated, and perhaps even experienced as a transition in terms of sense of self” (Meyer and Land, 2006, p.19).

Threshold concepts assist learners to distinguish for the first time, within a hitherto undifferentiated landscape, phenomena that are amenable to analysis in the discipline (Meyer and Land, 2003, 2006). They are “central to the mastery” of the subject concerned (Cousin, 2006, p.4). Threshold concepts provide “a distinctive and useful way of characterising a way of thinking and practising” (Davies, 2006, p.80) which differentiates between those who are ‘inside’ the subject (e.g., teachers) and those who have not yet grasped that way of seeing (e.g., students).

3.2 Characteristics of threshold concepts

A threshold concept is seen as comprising a number of characteristics or attributes that assist in identifying it. These characteristics give insight about the process a learner goes through when understanding a threshold concept. Across a range of subject contexts, these concepts are likely to be transformative, irreversible, integrative, bounded, troublesome and discursive (Meyer and Land, 2003, 2005). Implicit in the threshold concepts framework is a recognition of inter-individual differences in the manner in which threshold concepts will be apprehended and experienced by students (Baille et al., 2013). This reason has been put forward to justify “the apparent (to some) looseness of the language” used to describe the characteristics of threshold concepts (ibid., p.240).

3.2.1 Transformative

If specific concepts are to be called threshold concepts, the key is that they are transformative. Knowledge and understanding will always be ritualistic until threshold

concepts have been acquired (Meyer and Land, 2003). Once understood, the potential effect of threshold concepts on student learning and behaviour is to “occasion a significant shift in the perception of a subject” (Meyer and Land, 2005, p.374) and bring about transformational knowledge (Meyer and Land, 2003). As students acquire threshold concepts and extend their use of language in relation to these concepts, there occurs a shift in the learner's subjectivity, a repositioning of the self (Meyer and Land, 2005). Threshold concepts, these authors contend, not only transform thought but also lead to a transfiguration of identity and the adoption of external discourse. Grasping a threshold concept “involves an ontological as well as a conceptual shift. ... New understandings are assimilated into our biography, becoming part of who we are, how we see and how we feel” (Cousin, 2006, p.4). This transformation process can be likened to a fluid state bridging the transition between the learner and the portal. It is a “messy journey back, forth and across conceptual terrain” (ibid., p.5).

The metaphor of the post-lapsarian state of Adam and Eve after their expulsion from Eden illustrates how new knowledge radically transforms their landscape as they pass through the threshold from innocence to new experience:

> They have gained a new understanding and their identity has shifted ... They have grown up. They have become adult and have left a world of innocence. However, their gain feels like loss. Their new knowledge is troublesome. (Meyer and Land, 2006, p.xiv)

Progress through the portal leads students to a position where they are able to re-work the understanding they have previously acquired and incorporated into their thinking. Such transformative capacity is referred to as “the superordinate and non-negotiable characteristic of a threshold concept” (Land et al., 2016, p.xii). Baille et al. (2013) claim that “the essential property of a threshold concept is its transformative character” (p.229). This transformative conceptual power was previously conferred by a bounded disciplinary community in endorsing the concept (Baille et al., 2013; Meyer and Timmermans, 2016; Timmermans and Meyer 2017). Transformation includes “outcomes in ‘ways of knowing’, ‘becoming’, and ‘being’. The ‘being’ represents the very essence, the capability” to think in the subject (Timmermans and Meyer, 2017, p.8).

3.2.2 Irreversible

Once learned the concept would be very “unlikely to be forgotten or unlearned only through considerable effort” (Meyer and Land, 2005, p.374); “there would seem to be no re-winding of the transformative process” (ibid., p.377). Baille et al. (2013) contend that “once understood the concept cannot become ‘not-understood’” (p.229). This may be part of the reason why some ‘experts’ find difficulty in accepting why students do not understand what might seem to them blindingly obvious (Magdziarz, 2016; Meyer and Land, 2003). Expert practitioners looking back across thresholds they have personally long since crossed find it difficult to understand (from their own transformed perspective) the difficulties faced from (untransformed) student perspectives (Meyer and Land, 2005).

3.2.3 Integrative

Threshold concepts have an integrating function. They bring “what formerly appeared to be disparate elements into a coherent relationship, much as the addition of a particular jigsaw piece may bring other pieces together to provide a new and meaningful perspective” (Land et al., 2016, p.xii). Threshold concepts provide them with a ‘window’ that help in understanding the disciplinary dimensions of a subject and its underlying structures (Meyer and Timmermans, 2017, p.7); “previously occluded relationships between former disparately perceived aspects of the subject landscape are revealed. This revelation may be protracted or sudden in the sense of something ‘clicking together’” (Baille et al., 2013, p.229). Cousin (2006) claims that “mastery of a threshold concept often allows the learner to make connections that were hitherto hidden from view” (p.4). They may help to reveal a discipline’s underlying ‘episteme’. Perkins (2006) defines episteme

> as a system of ideas or way of understanding that allows us to establish knowledge … [Epistemes] are manners of justifying, explaining, solving problems, conducting enquiries, and designing and validating various kinds of products or outcomes. (p. 42)

Identifying threshold concepts assists teachers in making explicit the underlying episteme of a subject; educators are disciplinary experts for whom ways of thinking and practising have become tacit (Meyer and Timmermans, 2017).

3.2.4 Boundedness

Threshold concepts may be bounded in conceptual spaces that have terminal frontiers (Meyer and Land, 2005, 2006). Such boundedness may in certain instances serve to constitute the demarcation between disciplinary areas and define academic territories.

Meyer and Land (2005) argue that “the determination of such boundaries, however, immediately raises questions relating to hierarchy and relations of power within learning environments and academic communities more widely” (ibid., p.374). One should be aware, for instance, that since a threshold concept can be a form of disciplinary property, its presence in a curriculum “may carry an inherent tendency to invite congealed understandings” (Cousin, 2006, p.4). One implication is to adopt an attitude of questioning the concept itself (ibid.); their explanatory capacity is provisional.

3.2.5 Troublesome

Threshold concepts are “potentially (and possibly inherently) troublesome” (Meyer and Land, 2003, p.5); where they “exist within curricula there is a likelihood, owing to their powerful transformative effects, that they may prove troublesome for students” (ibid., p.12). They may represent, or lead to, what Perkins (1999, 2006) describes as ‘troublesome knowledge’ – knowledge that is conceptually difficult, “requiring a suspension of disbelief” (Baille et al., 2013, p.229) or even “intellectually absurd at face value” (Meyer and Land, 2003, p.2). This is because of the counterintuitive nature of these concepts which may be subversive, alien (emanating from another culture or discourse) or incoherent (discrete aspects are unproblematic but there is no organising principle) (Perkins, 1999, 2006).

From the point of view of the expert, a threshold concept is an idea which gives shape and structure to the subject, but it is inaccessible and off-putting to the novice (Davies, 2006). It can appear to be a denial of the world which the student experiences. Not only are ‘content concepts’ troublesome, but also the underlying epistemes of the disciplines make trouble for learners, with “confusion about content concepts often reflecting confusion about the underlying epistemes” (Perkins, 2006, p.45).

These learning thresholds are often the points at which students experience difficulty; threshold concepts cannot easily be assimilated or accommodated within one’s existing meaning frame (Land et al., 2016). They are often troublesome as they entail

a letting go of earlier, comfortable positions and encountering less familiar and sometimes disconcerting new territory (Cousin, 2006; Meyer and Land, 2003). This entails an uncomfortable ontological shift, as, in many respects, we are what we know. This transformation, though necessary for progress within the subject, may prove "personally disturbing and disorienting, leading to hesitancy or even resistance in learners" (Meyer and Land, 2003, p.3).

It "increasingly appears that a threshold concept may on its own constitute, or in its application lead to, such troublesome knowledge" (Meyer and Land, 2003, p.2). Unless the threshold concept concerned is grasped, it will remain fuzzy and hazy in the student's mind throughout the period of study, leading to troublesome knowledge; up to this point progression within the subject will remain fragmented. In this sense, Davies (2006) discusses two situations. One occurs when a threshold concept is introduced too early by the teacher. Then it becomes inaccessible to the student and can only be learnt in a rote fashion which emphasises its lack of real meaning to the learner. 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" (ibid., p76).

Comprehending a threshold concept brings about a transformed internal view of subject matter, subject landscape, or even world view. The student can move on. Albert Einstein is alleged to have once remarked: "In the middle of difficulty lies opportunity"[2]. It is often through encounters with conceptual difficulty or troublesome knowledge that we are obliged to revise our prevailing conceptions, consider matters differently, think otherwise and see anew. This can be exhilarating and liberating, but it can prove unsettling and uncomfortable. Without a certain amount of anxiety and risk, Lee Shulman has argued, there's a limit to how much learning occurs: "One must have something at stake. No emotional investment, no intellectual or formational yield"

[2] Einstein, A., cited by Wheeler, J.A., interviewed in *Cosmic Search*, *1*(4) (Fall 1979). (Wheeler does not indicate in the interview whether he is quoting Einstein verbatim, or offering his own description of how Einstein worked).

(Shulman, 2005, p.22). In this vein, Meyer and Timmermans (2016) maintain that troublesomeness can be “used deliberately to provoke the condition of a liminal state that captures inter-individual variation across cognitive, epistemic, and ontological dimensions” (p.28). This is the variation in those critical features of threshold concepts that might be experienced by students as illogical and leading to ‘stuck places’. However, this process should lead to learning. Meyer and Land (2006) contend that in order to be transformative, knowledge should be troublesome, “but that does not mean it should be stressful or should provoke the kinds of anxiety, self-doubt and frustration that can lead students to give up” (p.xiv).

Different kinds of knowledge may be troublesome for some learners (Perkins, 1999). The kinds of knowledge referred to are inert, ritual, conceptually difficult and foreign knowledge. Inert knowledge is the knowledge that a learner has but it has not been used to actively associate this knowledge with their world, their life or society; it is not related or relevant to their real-life situations and needs (Baille et al., 2013). Such knowledge is troublesome because students need to learn the isolated bits of knowledge before they can be integrated, but it is then difficult to persuade them to see the whole in a new integrated way.

Ritual knowledge is of a routine nature such as following pre-defined procedures. It is knowledge that students accept that they need to know but do not appreciate the complexity of the knowledge or the reasons why they need to know it. Students might rote learn or memorise concepts but do not really understand or fully grasp the application of knowledge when faced with varying or different situations. Conceptually difficult knowledge is a mixture of ritual knowledge and misunderstanding where a student knows ritual responses but intuitively their beliefs and interpretations are rediscovered when confronting qualitative problems. In an attempt to learn difficult concepts, students mix expert views of the concept with their own less powerful conceptions. The notion of passing through thresholds involves a discovery by the individual concerned that previously held ideas are inadequate in the light of new insights (Meyer and Land, 2005, 2006). Perkins (1999) acknowledges that a combination of these kinds of knowledge may prove troublesome. For instance, in an attempt to help students understand better, teachers sometimes create a naïve version of the concept, enticing students to enter into a form of ritualised learning.

When learners fail to understand the concept, teachers simply ask them to do more of the same (Baille et al., 2013).

Finally, alien or foreign knowledge results when students become confused in trying to understand why their own understanding of knowledge conflicts with the knowledge they are taught (Meyer and Land 2003; Perkins, 1999). For example, knowledge of differing value systems that exist for different nationalities may provide confusion for a person trying to come to terms with the value system of a different nationality compared to their own. Ultimately a transformation in learning takes place that enables learners to extend their understanding and open the way for further learning.

Meyer and Land (2003) refer to two further kinds of knowledge that may be troublesome - tacit knowledge and troublesome language. Tacit knowledge is knowledge that is shared within a community of practice but is not explicitly identified, taught or learnt. This knowledge may prove troublesome where the teacher does not make explicit to students aspects of understanding the discipline that have become 'second nature' to the teacher. Tacit knowledge is linked to a way of thinking and seeing in a discipline that is not always made explicit to students, albeit unknowingly by the educator (ibid.). Another instance is when a person comes into a new community. S/he may not pick up the nuances of different concepts that are 'common sense' to experienced members (Baille et al., 2013). Consciousness on the part of teachers of their tacit knowledge may enhance their students' learning (e.g., Magdziarz, 2016).

Troublesome language refers to discourses "developed within disciplines to represent (and simultaneously privilege) particular understandings and ways of seeing and thinking" (Meyer and Land, 2005, p.9). This language can be troublesome for the newcomer and impact on his/her learning, especially if the words have other interpretations in ordinary conversation. For instance, with reference to the accounting discipline, Magdziarz (2016) describes how students may be already aware of some terms in everyday life, such as the words 'asset' and 'capital'; these take on a different meaning or are seen in a different context in the accounting discipline. Hence, a transformation in thinking is required where students need to update their everyday understanding of the accounting elements to include an understanding from an accounting disciplinary perspective and thereby challenge their existing thinking in trying to grasp how to think in an accounting context, and use and understand

discipline based language. There may be other disciplinary terms, such as ‘accrual accounting’, which students do not have prior knowledge of, which in turn provides difficulty for them in trying to relate it to their own understanding of the world (ibid.).

Perkins (2006) argues that another source of troublesomeness emanates from the student’s motivation to learn. While the teacher might be doing his/her best regarding decisions about “how to teach” (ibid., p.45), it is important that students do their part and decide to be involved in the learning process: “Despite lucid explanations and engaging activities, those learners who find themselves interested less and struggling more tend to make knowledge troublesome for themselves” (ibid.).

3.2.6 Discursive

Meyer and Land (2005) suggest that the crossing of a threshold incorporates an enhanced and extended use of language. They contend that “it is hard to imagine any shift in perspective that is not simultaneously accompanied by (or occasioned through) an extension of the student’s use of language” (p.374). Besides leading to a transfiguration of identity, threshold concepts thus facilitate the “adoption of an extended discourse” (Meyer and Land, 2005, p.375) and the capacity to meaningfully participate in the high-level narratives of the subject “in a manner that characterises particular disciplinary discourses; how, for example, biologists, economists, historians, lawyers or sociologists think” (Baille et al., 2013, p.229). “Through this elaboration of discourse new thinking is brought into being, expressed, reflected upon and communicated” (Meyer and Land, 2005, p.374).

3.3 Thinking in the subject

Threshold concepts provide a way of describing the ‘way of thinking’ distinctive to a discipline (Davies, 2006; Meyer and Land, 2003; Timmermans and Meyer, 2017). They “may represent how people ‘think’ in a particular discipline, or how they perceive, apprehend, or experience particular phenomena within that discipline” (Meyer and Land, 2003, p.412). For example, a theme emanating from the research study of Magdziarz (2016) and linked to the troublesome nature of a threshold concept is a particular way of thinking and practising in the accounting discipline.

The characteristics of threshold concepts can be seen in the light of ‘joining a community’ (Meyer and Land, 2003). Threshold concepts are likely to be troublesome because they operate at a deep integrating way in a discipline and are often taken for

granted by the epistemic community and therefore rarely made explicit. Once acquired, they are transformative in the way individuals perceive themselves as well as the discipline. In gaining access to a new way of perceiving, they gradually gain access to being part of a community. Since a threshold concept is irriversible, it is inconceivable that they would return to viewing not only the world around them, but also the subject community and themselves, in the way they did before. The integrative quality of a threshold concept “provides coherence” in that the substantive knowledge and procedures of a discipline make sense to them when before they seemed alien; “a threshold concept necessarily helps to define the boundaries of a subject area because it clarifies the scope of a subject community” (Meyer and Land, 2003, p.74).

It does not mean that students who have not grasped such concepts will be inferior in some way but they will not have the outlook on the subject and the approach that those who have do – they will not think in the subject. Only when students are able to understand the relationships between the concepts will they be able to think in the subject (e.g., Ashwin, 2015). This allows students to look at new and old concepts in different and new ways and so changing “the learner’s sense of identity in relation to a subject community” (Davies, 2006, p.80). Students acquire an understanding of how a community thinks and practises once they come to view themselves as part of that community. This implies a self-awareness which ought to be susceptible to exposure and external observation (ibid.). Davies (2018) further proposes that a group of threshold concepts “may combine to characterise a way of thinking and practising - or overall framework - in a discipline” (p.7). He argues, for instance, that students’ understanding of economics matures as successive threshold concepts are integrated into a scientific framework.

3.4 Core and threshold concepts

Meyer and Land (2003) distinguish between threshold concepts and core concepts. Core concepts are important concepts in the body of knowledge that form the boundary of a discipline. An understanding of these core concepts allows a person to become part of the ‘culture’ that characterises the skills, attitudes and methods used by experts in the discipline. They are the conceptual building blocks that enable progression of understanding in the subject (Meyer and Land, 2003).

These authors outline the characteristics of a threshold concept as distinct within what are usually referred to as core concepts. A core concept helps a learner understand a subject but “does not necessarily lead to a qualitatively different view of subject matter” (ibid., p.4). They use an example of gravity as a threshold concept while citing the centre of gravity as a core concept. Whilst important, core concepts do not take the learner into a new realm but rather build layers upon the learning foundations already possessed and assist in determining the threshold concepts in a discipline.

3.5 The affective component in threshold concepts learning

Whilst learning threshold concepts, many knowledge encounters are emotionally charged (Cousin, 2006; Land et al., 2016; Timmermans and Meyer, 2017); an affective domain is engaged with (White et al., 2016). Threshold concepts instigate both cognitive disequilibrium (Timmermans and Meyer, 2017) and epistemic and ontological unmooring as students consider the available options, before rejecting or otherwise defending their current beliefs (Barradell, 2013). Their emotional responses to, and motivational dispositions towards these experiences may vary.

An affective component involving a shift in values, attitudes and feelings is at stake with transformation (Cousin, 2006). The teacher’s pedagogy needs therefore to give due consideration to the affective and social dimensions of learning (Cousin, 2006; Meyer and Land, 2006; Mizzi, 2018, 2020). Teachers should cultivate attitudes that foster a supportive classroom learning environment (Kyriacou, 2009; Mizzi, 2007, 2018, 2020; Tomlinson, 2003, 2006, 2014), and cultivate a “third ear that listens not only for what a student knows (discrete packages of knowledge) but for the terms that shape a student's knowledge” (Ellsworth, 1997, cited in Land et al., 2006, p.200). Students may need to be assisted when they get stuck in learning (e.g., Barradell, 2013). This area about emotion and motivation in threshold concepts learning is a particularly important area for further investigation for scholars of threshold concepts (Land et al., 2016; Timmermans and Meyer, 2017).

3.6 The liminal dimension of the threshold concepts framework

The process of moving through threshold concepts has been described as a transformational state of ‘liminality’ (Meyer and Land, 2003, 2005, 2006). This notion of liminality has been drawn from the ethnographical studies researching central social rituals such as rites of passage associated with the initiation of adolescent boys into

manhood amongst traditional societies. The term 'liminality' (from Latin ‘limen’, boundary or threshold) has been adopted to characterise the transition of space or time within which these rites were conducted. Meyer and Land (2005, 2006) have developed the argument that acquiring a threshold concept and/or entry into a discipline’s community of practice may be likened to a ‘rite of passage’. The comparison of liminality to rituals or rites of passage is useful for a number of reasons (Meyer and Land, 2005). First, these authors propose that the condition of liminality may be transformative in function - there may be a change of state or status. An example is when a teacher reflects that a particular student is beginning to think in the subject; “teachers within the disciplines are certainly aware of particular patterns of thought and insights that have such ontological significance” (Meyer and Land, 2006, p.23). Second, as a result of the ritual the participating individual acquires new knowledge and subsequently a new status and identity within the community. This is clearly true of the professions and their (often) self-regulatory status. A third consideration is that the transformation can be protracted, over periods of time, with learners oscillating “between old and emergent understandings just as adolescents often move between adult-like and child-like responses to their transitional status” (Cousin, 2006, p.4). This liminal state can be thought of as an ‘in-between’ state in which learners oscillate between earlier, less sophisticated understandings, and the fuller appreciation of a concept; conceptual change happens through navigating this liminality during the learning process (Cousin, 2006; Meyer and Land, 2005, 2006; White et al., 2016).

There are two typical psychological responses to liminality, either a strategy of fight or one of flight (e.g., procrastination, postponement, giving up easily) (e.g., Land et al., 2016; Meyer and Land, 2006). When a student strives to enter the liminal space, s/he is “engaged with the project of mastery unlike the learner who remains in a state of pre-liminality in which understandings are at best vague” (Cousin, 2006, p.4). Liminality implies that students will not be able to transfer their understanding of certain concepts to new contexts – a characteristic of deep learning, and to appreciate how these concepts can be used to help explain other scenarios and issues in the discipline. Their learning will remain largely isolated and behaviour will not have changed.

Liminality offers a “useful metaphor in aiding our understanding of the conceptual transformations students undergo, or find difficulty and anxiety in undergoing, particularly in relation to notions of being ‘stuck’” in learning (Meyer and Land, 2006, p.27). White et al. (2016) contend that a critical question underlying the notion of threshold concepts relates to the nature of this “stuckness”. Figure 1 describes the liminal state of students, as they get ‘stuck’ on a concept and then move through the process of getting ‘unstuck’ to resolution, with variance in their confidence in the resolution.

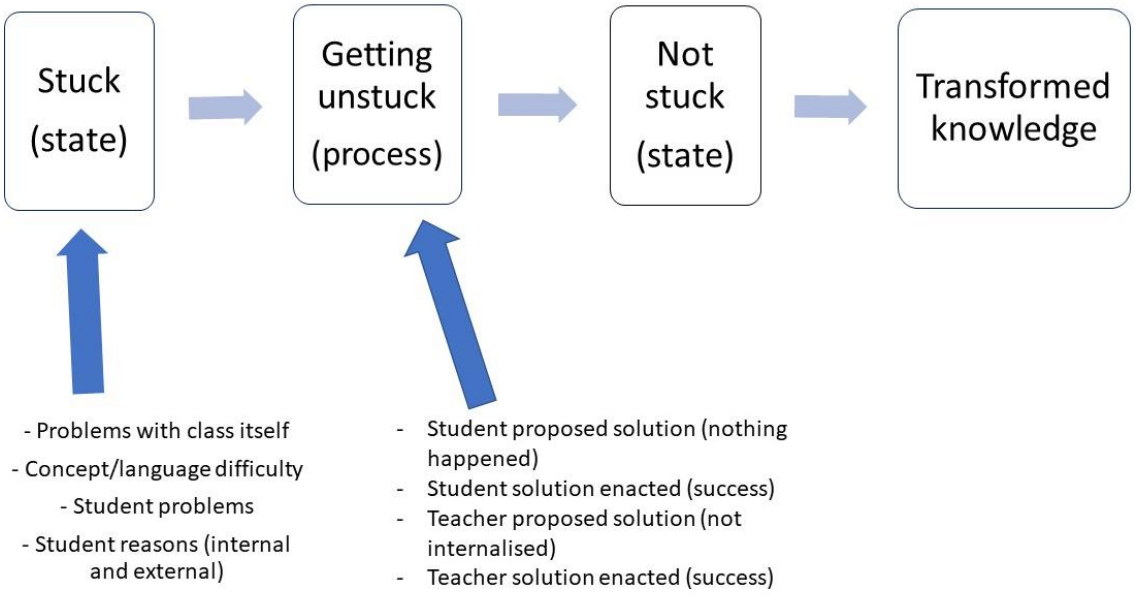

Figure 1. Students’ experience with liminality (White et al., 2016, p.59)

Meyer and Land (2006) describe how during the liminal or “suspended” state “understanding approximates to a kind of mimicry or lack of authenticity” (p.16). During this period preceding the actual threshold crossing, students mimic both language and behaviours until they cross the threshold into thinking as a scholar in their discipline (Cousin, 2006; Meyer, and Land, 2006). Meyer and Land (2005, 2006) contend that it is tempting to interprete such mimicry with surface approaches to learning. Such mimicry, however, “may involve both attempts at understanding and troubled misunderstanding, or limited understanding, and is not merely intention to reproduce information in a given form” (Meyer and Land, 2006, p.24).

Meyer and Land (2006) describe how a student,

> having glimpsed the outline of a threshold portal and perhaps only vaguely aware of what lies beyond it, but conscious of the failure to cross it, may engage in two forms of mimicry. The first is compensatory mimicry, in an assuage of self that something is understood – witness the novice student who rehearses what is known (but irrelevant) in learning for examinations, rather than what is required to be known for them. The second is conscious mimicry, when the student is aware that what is required is beyond grasp, other than through the mimicry of pretension. (p.24)

Students may therefore present a partial, limited or superficial understanding of the concept to be learned (Meyer and Land, 2005). This characterisation is without negative intent, as the mimicry might be a purposive coping strategy in the wrestle for understanding and clarity (Cousin, 2006). The worry for teachers is that students will substitute learning for a permanent strategy of mimicry (ibid.). A more serious outcome is that students can become frustrated, lose confidence and give up that particular course. Such a passage can in fact be humbling for the learner. However, this process is inevitable for learning to take place; Baille et al. (2013) maintain that since learning is never at an end, there is "no supposed 'post-liminal' state that isn't followed by increased liminality - hence the notion of continual waves of less and more comfortable liminality" (p.243). On a positive note, which I liked, Davies (2018) describes liminality as "a self-awareness of being at a moment of significant change in learning" (p.6). Teachers are encouraged to do their best in assisting their students in growing out of their state of mimicry. One suggestion in this regard put forward by White et al. (2016) is that teachers are to be aware of their own underlying assumptions about a concept (for instance, their own tacit knowledge) and strive to convey complete explanations of the concept concerned.

3.7 Criticism of threshold concepts

The notion of threshold concepts has been mainly criticised in terms of how they are defined. There is lack of agreement about what the threshold concepts are within disciplines (Barradell, 2013), about their transformative nature, and about other unanswered questions. The distinction between threshold concepts and core concepts is also not clear. Another criticism is levelled at the research in threshold concepts.

A main concern is that the attributes of threshold concepts might be too vague and difficult to identify (Barradell, 2013; Davies, 2006; Magdziarz, 2016; Rowbottom, 2007; White *et al.*, 2016). Barradell (2013) stresses that identification matters because of the potential impact of threshold concepts on the learning experiences of students:

“remembering why we want to identify threshold concepts in the first place ultimately helps the process” (ibid., p.269). How are we to identify, validate, and address threshold concepts within an individual discipline? Who decides if a threshold concept is really a threshold concept? (e.g., White et al., 2016) It is not an easy task identifying threshold concepts; the idea of a threshold concept might be in itself a threshold concept (Atherton et al., 2008, cited in Barradell, 2013).

Davies (2006) argues that “by their ‘taken-for-granted’ nature, threshold concepts tend to be obscured from overt dialogue between teachers and learners” (p.71). “Conversation amongst teaching and learning stakeholders is fundamental” (Barradell, 2013, p.274). Transactional curriculum inquiry emphasises that consultation amongst all stakeholders including academics, students and educational developers is necessary (ibid.); “collaboration is quintessential” (ibid., p.272).

Particular statements such as ‘probably irreversible’, ‘possibly often (though not necessarily) bounded’ and ‘potentially (though not necessarily) troublesome’ (Meyer and Land, 2003) are vague and might even question whether threshold concepts exist in a discipline (Rowbottom, 2007). For example, Magdziarz (2016) added more clarity around the ‘irreversibility’ attribute by suggesting that this characteristic can be amended as follows: “probably irreversible in that once it is grasped, it is not likely to require a great deal of effort to remember the threshold concept” (p.137). In this way, the description of this attribute has been expanded to recognise that a threshold concept could be forgotten but if able to be recalled at ease would still satisfy this attribute.

Rowbottom (2007) stresses that most concepts could be argued to be transformative or at least have the potential to be so. In addition, the transformative nature of a concept will be dependent on the individual and the conceptual scheme that the individual possesses. What is transformative for one individual may not be for another because of the system of concepts that the individual arrives with in the learning experience. The transformative aspect of a threshold concept referring to a significant change in a way of thinking implies that there are degrees of transformation (ibid.).

This framework has other unanswered questions; “this ready acceptance of something that still is emerging has meant that aspects of the discussion around threshold concepts have not necessarily been undertaken with the rigour they perhaps should”

(Barradell, 2013, p.266). These questions mainly surround the fluid definition and interpretation of threshold concepts and their respective characteristics in terms of whether all characteristics of the definition need to be met for a threshold concept to exist and the relative importance of one characteristic compared to the other characteristics (Barradell, 2013; Rowbottom, 2013). What is the number of characteristics required of the definition for a concept to be regarded as a threshold concept? Are some characteristics more important than others? Should all of the characteristics be present at the same time (e.g., Davies and Mangan, 2007) or at different stages of learning? Or is it a 'pick and mix' approach (Davies, 2018) in that any one of these characteristics might be observed to some degree in any conceptual change? Who decides what characteristics to value, which to disregard and why? Does a concept need to present itself the same way to everybody for it to be called a threshold concept?

In visualising it as a border or a limit, a threshold concept in a discipline can be understood as a pre-requisite for progression (Rowbottom, 2007). If this is the case then threshold concepts begin to look like core concepts rather than being distinct (ibid). For instance, regarding the suggestion of Meyer and Land (2003) relating to gravity as a threshold concept whereas centre of gravity is not, I agree with Rowbottom (2007) that this is puzzling. Timmermans and Meyer (2017) contend that in the early stages of their research, people were more likely to identify content-related concepts, with more epistemologically and ontologically focused thresholds revealing themselves through deeper analysis. On another note, Rowbottom (2007) argues that if troublesomeness is taken to be the most salient feature, what distinguishes a threshold concept from any core concept that a student may get stuck on?

Threshold concepts carry not only theoretical complexity but also methodological challenges in research (Barradell, 2013). This may lead to potential validity and reliability problems when undertaking empirical research on threshold concepts (e.g., Magdziarz, 2016). Quinlan et al. (2013), cited by White et al. (2016), is critical of the lack of methods and protocols used in researching threshold concepts. They maintain that there is an over-reliance on qualitative research methods and a lack of clarity by writers as to how they have chosen the characteristics they have used in identifying threshold concepts. Magdziarz (2016) argues that

> the myriad of approaches to undertaking these studies and the absence of clearly explicated theory (while perhaps reflective of the exploratory stage of research on this topic) makes drawing any initial (albeit tentative) definitions, or conclusions, about threshold concepts and how to ascertain what they might be somewhat difficult, perhaps even "troublesome"! (p.54)

Most research studies in threshold concepts have been undertaken in higher education disciplines (e.g., Land et al., 2016; Meyer and Land, 2006). Research at secondary education level is very scant. Much of the early work on thresholds was from the perspective of teachers (Land et al., 2016). Insights are gained if students are included as co-enquirers and co-explorers into the nature of thresholds in relation to their own learning experience (ibid.).

Despite these criticisms, continued research in this area is providing evidence that threshold concepts may be a plausible avenue for educators to investigate (e.g., https://www.ee.ucl.ac.uk/~mflanaga/thresholds.html). After all, when Meyer and Land wrote the framework in 2003, it was not "meant to be definitive. Its evolving nature therefore presents challenges when identifying threshold concepts" (Baille et al., 2013, p.274). The preface to Land et al. (2016) claims that threshold concepts have been used to make sense of practice in 259 subjects in over 45 countries. One advantage of this notion is that it "seems to 'ring true' to lived experience" (Davies, 2018, p.6), providing insights for curriculum, pedagogy and assessment.

3.8 Considerations for pedagogy, curriculum and assessment

Identifying threshold concepts facilitates the planning and enactment of teaching and learning and assessment (e.g., Baille et al., 2013; Land et al., 2016; Meyer and Land, 2003, 2006; Shanahan et al., 2006; Timmermans and Meyer, 2017). They "constitute an obvious, and perhaps neglected, focus for evaluating teaching strategies and learning outcomes" (Meyer and Land, 2003, p.13). Threshold concept theory may help teachers explain the difficulties that a student encounters during the learning process (Meyer and Land, 2003), provide links and relationships between the outcomes of learning and the deep or surface approaches to learning adopted by students, understand better the impact on curriculum design and teaching approaches (Cousin, 2006; Shanahan et al., 2006), and assist reflection on what is being taught, how, why and when to streamline teaching and assessment approaches (e.g., Barradell, 2013; Timmermans and Meyer, 2017).

Knowledge of threshold concepts can assist teachers in developing and managing a curriculum - employing a threshold concept approach for curriculum design (e.g., Cousin, 2006; Shanahan et al., 2006). In this sense, threshold concepts have been referred to as the 'jewels in the curriculum' because they help identify key areas that need mastery (Land et al., 2006). Hence, identifying what the threshold concepts are in a discipline is an important first step in curriculum design:

> A focus on these jewels allows for richer and more complex insights into aspects of the subjects students are studying; it plays a diagnostic role in alerting tutors to areas of the curriculum where students are likely to encounter troublesome knowledge and experience conceptual difficulty. (ibid., p.198)

Threshold concepts can also be used to help students see the integrated nature of the discipline that goes beyond a particular course; this is a 'major undertaking' of teachers, that of helping students to 'get inside' the subject (Davies, 2006, p.76). The curriculum should not be taught in isolated pieces but as an integrated part of a whole learning experience that encourages lifelong learning. Through a deliberate and conscious effort, teachers can understand better the learner experience in terms of how students learn a particular threshold concept and recognise when an "aha" moment has been reached but also how and why a student can get stuck in learning.

A number of pedagogical issues can be considered when trying to support students in grasping threshold concepts in their respective discipline. Once a threshold concept has been identified, teachers are encouraged to provide students with basic concepts that may be open to variation (e.g., Meyer and Land, 2003) but that form a foundation that can later be re-worked when further teaching and learning takes place (e.g., Timmermans and Meyer, 2017). This should be a gradual learning process using variation in learning and creating awareness among students that tolerating uncertainty is a common part of the learning process. In due course, the knowledge of variation would be informing new forms of pedagogical practice (Baille et al., 2013; Meyer and Land, 2003).

Attention must be given to the manner in which students are initially introduced to threshold concepts (Davies, 2006; Meyer and Land, 2005, 2006). This involves the choice of language used to introduce these concepts, because "the naming and explanation of the concepts themselves can be troublesome and can present epistemological obstacles" (Meyer and Land, 2006, p.28). If a teacher introduces a

threshold concept too early, it might become inaccessible to the student and only learnt in a rote fashion (Davies, 2006).

Teachers should also be aware that there exists variation in how teachers think about and understand threshold concepts. They develop knowledge of, and strategies for, teaching and learning that are related to their discipline's epistemic and socio-cultural structures and perhaps mediated by their personal epistemologies (Meyer and Timmermans, 2016). For example, one could not expect that "one biologist's representations of, and repertoire for, teaching a threshold concept such as 'photochemical response' would closely resemble another's" (ibid., p.31).

Teachers should be aware that not all students experience threshold concepts in the same way - it is "sometimes transformational" for teachers to realise this as it influences their approaches to designing instruction (Timmermans and Meyer, 2017, p.9). The degree of troublesomeness associated with a particular threshold concept encountered by individual learners will vary (Meyer and Land, 2006). The very willingness of learners to engage with the threshold concept itself and navigate the associated liminal space is equally varied (ibid.). Some learners are willing, or even eager, to enter the liminal space in the hope of emerging transformed or coming to a new way of understanding whilst others pause at the entrance seemingly unable or unwilling to let go of their pre-existing understandings (Cousin, 2006; Meyer and Land, 2003, 2005). There is also individuality in the timing of the actual threshold crossing; such a Eureka moment might also frequently be sighted and rejected on several occasions and only gradually accepted, if at all (White et al., 2016). Teachers need to create 'holding environments' to support students through their experiences of conceptual difficulty - that they may move on and succeed (Meyer and Land, 2006). Threshold concepts are not just about knowledge, they also are about confidence (Land et al., 2016). In order to help students acquire threshold confidence and cross a threshold, a teacher needs to help them believe that they "belonged 'on the other side'" (Land et al., 2016, p.xiv).

Perkins (2006) proposes a constructivist response that can help into "luring students into learning in ways deeper than those to which they might be disposed" (p.45). In particular, he advocates pragmatic constructivism, treating constructivism as a toolbox for problems of learning. An educator is encouraged to try various approaches - "more structured, less structured, more discovery-oriented, less discovery-oriented,

whatever works" (ibid.). Timmermans and Meyer (2017) propose a number of strategies which educational developers and teachers can use to generate a repertoire of teaching and learning activities to help students learn threshold concepts. These include designing opportunities to help students confront the 'troublesome' features of the threshold concept concerned, providing opportunities for 'targeted practice and feedback' (p.10) and viewing assessment as part of the teaching and learning process.

Threshold concept theory advocates 'a more dynamic approach to assessment' (Land and Meyer, 2010, p. 61). Rather than a snapshot approach characterised by traditional assessment, assessment needs to be more dynamic; students might give 'correct' answers but retain fundamental misconceptions (Meyer and Land, 2006). Transformations occurring during the learning of thresholds "require a more nuanced and generative model of assessment to help us purposefully identify variation in progress and understanding between individual learners" (Land and Meyer, 2010, p. 63). Assessment processes need to reflect and represent the ontological shift required by threshold concepts, and "making sure that we are assessing them on that learning" (Baille et al., 2013, p.236). The teacher is encouraged to employ approaches that enable the learner to demonstrate his/her learning journey upon which the teacher can make judgements about the extent to which s/he is progressing on the journey to thinking in the subject (e.g., Shanahan et al., 2006). These include write aloud assessment methods such as the writing of blogs, learning journals and diaries, and sequential conceptual mappings as part of an assessment plan that captures observable evidence of transformation in students' understanding.

3.9 Threshold concepts in economics

A threshold concept in economics is one that, once understood, changes students' perspective of the world (Ashwin, 2015; Davies and Mangan, 2006; Shanahan, 2016). Their 'lens' of reference becomes one that gives preference to an economic way of thinking (ibid.). Such a fundamental shift is also difficult to unlearn. If fully accepted, it is likely to be irreversible (Land et al., 2006; Meyer and Land, 2003). A threshold concept in economics assists the student to "make sense" and integrate previously unrelated ideas within the discipline, as well as enhance the individual's communication of economics terminology (Meyer and Land, 2003; Shanahan, 2016). The emphasis is on the conceptual changes that a student must make before coming to 'think like an economist', and perhaps later, to be seen as, and to see himself/herself

as ‘an economist’ (Davies, 2018; Shanahan, 2016). So, for example, Davies (2006) explicates how the concept of ‘general equilibrium’ meets the characteristics of threshold concepts. He argues that this is a transformative concept because, once understood, it changes the way the student thinks about the consequences of economic events. Situations which for the student had previously appeared to be zero-sum games no longer appear so, and the outcomes of a decision are no longer evaluated on the basis of immediate effects. The systemic effects are also 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; this characteristic makes the concept irreversible (ibid.). General equilibrium also helps to define the boundaries of economics (ibid.).

‘Opportunity cost’ and ‘price formation through interaction between markets’ are regarded as critical developments in the history of economic thought (e.g., Davies, 2018). It is therefore unsurprising that they have been suggested as ‘threshold concepts’ (Meyer and Land, 2003; Davies and Mangan, 2006, 2007; Shanahan, 2016; Shanahan et al., 2006), together with the idea of the ‘zero-sum game’. Davies and Mangan (2007) have also proposed the concepts of marginality, elasticity and incentives as exhibiting the characteristics of threshold concepts.

Opportunity cost is the concept that has been mostly written about (e.g., Davies, 2018; Davies and Mangan, 2006, 2007, 2008, 2010; Meyer and Land, 2003; Modig, 2021; Shanahan, 2016; Shanahan et al., 2006, 2008). It is the foundation of concepts such as the production possibility frontier, consumer choice, demand schedules, the decision to supply, perfect competition, efficiency, comparative advantage, incentives, price signals, and markets generally (ibid.). This notion attempts to shift students’ thinking to consider the value of the next best, rejected alternative when making a choice (Shanahan, 2016; Shanahan et al., 2006). Meyer and Land (2003) outline its transformative effect:

> … [O]pportunity cost captures the idea that choices can be compared, and that every choice (including not choosing) means rejecting alternatives. A student who has a good grasp of this concept has moved a long way toward breaking out of a framework of thinking that sees choices as predetermined, or unchangeable. They have also moved toward seeing [at least] ‘two sides’ of every choice, and in looking beyond immediate consequences, and even just monetary ‘costs’ towards a more abstract way of thinking [about human behaviour]. (pp. 414–415)

Thus, if accepted by the individual students as a valid way of interpreting the world, it provides a tool for thinking about their own choices and interpreting the choices made by others.

Initially, opportunity cost is apprehended by students as a discrete concept. However, as a threshold concept, it may not be recognised as an independent entity. Davies and Mangan (2007) explain the existence of a web of interconnected concepts within economics - a single discipline-based threshold concept is nested within other concepts and students need to progress through these to grasp the discipline-specific concept. These interconnected concepts include the supporting personal and procedural concepts (ibid.). Personal concepts are economically oriented perspectives on everyday life, while procedural concepts are ways of practising or articulating economics. Learners may get stuck in their understanding of opportunity cost because these supporting concepts have not been sufficiently grasped to enable them to master a discipline-based concept (Davies and Mangan, 2007; Shanahan et al., 2006; Shanahan, 2016).

When a student develops an understanding of a further threshold concept in economics, it becomes embedded in his/her thinking and reconfigures ways of classifying economic phenomena and ways of understanding relationships between the respective phenomena (Davies and Mangan, 2006, 2007). Students are subsequently able to revise their understanding of any threshold concept they had already grasped (Davies and Mangan, 2007; Davies, 2018). This follows from the proposition that a group of threshold concepts may combine to characterise a way of thinking in a discipline (e.g., Davies, 2018).

Davies (2018) argues that the understanding of threshold concepts is made difficult by ways in which teachers as well as students use the technical terms to “refer to more simple ideas that bear limited correspondence to the ‘scientific’ understanding” (ibid. p.6). He clarifies by bringing an example from the concept of ‘opportunity cost’:

> The idea of opportunity cost is often presented in introductory economics in the following terms: ‘If we have £20 we can spend it on an economic textbook or we can enjoy a meal in a restaurant’. This statement falls into the category of ‘you can’t have your cake and eat it’: a classic everyday figure of speech. This is quite different from the idea that variations in price reflect the value, at the margin, of what people are willing to give up to obtain different products. (p.5)

This is a problem with threshold concepts, that terms intended to convey a new theoretical idea may have a different meaning in everyday usage (Land et al., 2014; Magdziarz, 2016).

3.10 Threshold concepts and critical realism

As discussed in section 2.3.2, critical realism suggests that there exist three layers of reality (e.g., Bhaskar, 2017; Lawson, 1997). These are the empirical (human sensory experiences and perceptions), the actual reality that exists beyond human experience, and the real (generative mechanisms which create the phenomena that we do experience). Although the actual reality that stimulates these processes lies hidden from our experience, it does influence us by its nature. Teachers adopting a critical realist conception towards the teaching and learning of a particular economics threshold concept can guide their students to explore these three layers of reality by guiding them into exploring their own variations in experiencing this particular concept, their variations in conceptions of this phenomenon, and the identification of acquisition of integreating this threshold concept (Davies and Brant, 2006). The aim is to "get students to see the world in a particular way by making connections that common sense would miss" (ibid., p.116), helping them to start thinking in the subject. Another approach towards exploring a threshold concept and discussed in section 2.3.2 is by following the 'DREIC' model of enquiry (Bhaskar, 2017; Brant, 2011, 2015). I contend that adopting a critical realist conception towards the teaching of a threshold concept enriches economics teaching and learning by facilitating students' understanding.

3.11 Conclusion

The notion of threshold concepts sheds light upon the concepts in a discipline which are crucial in opening up a new and transformed way of understanding, interpreting or viewing a topic. It provides insights into why some students find it troublesome to understand particular threshold concepts and into why certain students undergo a transformational or even creative experience in the liminal space of learning. This is a quest well worth pursuing (Davies, 2018; Meyer and Land, 2005; https://www.ee.ucl.ac.uk/~mflanaga/thresholds.html). Knowledge of transformative aspects of a curriculum can mean that the sources of troublesome knowledge (such as recognition of tacit knowledge of teachers) are addressed to enhance student learning (e.g., Davies, 2006). Curricula, resources, pedagogy and assessment can

then be directed to assist students pass through the state of liminality and beyond the threshold to be able to acquire conceptual change and see the world in new ways (White et al., 2016).

This process of working with threshold concepts is rewarding and complex work for developers and teachers (e.g., Timmermans and Meyer, 2017). It assists in rediscovering the beauty of a discipline. Most importantly, it provides the opportunity for “opening up discussions and creating community within and beyond disciplines about transformational ideas in learning and teaching” (ibid., p.11). Other useful notions, powerful knowledge and knowledge bases for teaching, are discussed in the next chapter.

4. Literature Review III: Powerful Knowledge and Knowledge Bases for Teaching

If economics education is to offer students opportunities to move beyond the experience and knowledge they bring to school, the economics curriculum needs to enable them to acquire knowledge that is not tied to that experience (Young, 2008, 2014, 2018, 2021; Young and Muller, 2010). This relatively context-free knowledge has been described as powerful knowledge (ibid.). This is explored in section 4.1.

Facilitating the students' interaction with this knowledge is conceptualised as a complex process that draws on many kinds of knowledge (e.g., Banks et al., 1999, 2005; Deng, 2018, 2020; Durden, 2020; Hashweh, 2005; Mishra and Koehler, 2006; Moore, 2004; Shulman, 1987; Stobart, 2014; Turner-Bisset, 2001). Section 4.2 discusses the various knowledge bases for teaching and how they combine together in different ways to satisfy the students' entitlement for access to knowledge.

4.1 Powerful knowledge

Teachers need to be engaged in deeper thought about what is taught and why it is being taught (Deng, 2020; Lambert et al., 2016; Mitchell and Lambert, 2015; Young, 2018). The notion of powerful knowledge is helpful for identifying what counts, or what is valued, as knowledge in the particular subject taught (Harland and Wald, 2018; Young, 2008, 2014e, 2021; Young and Muller, 2010).

4.1.1 Entitlement to knowledge

Young (2013a, 2014b) argues that the curriculum must start from a student's entitlement or access to knowledge and that schooling should be an entitlement to knowledge for every person. He summarises the primary purpose of schools as enabling

> all students to *acquire knowledge* that takes *them beyond their experience*. It is knowledge which many will not have access to at home, among their friends, or in the communities in which they live. As such, access to this knowledge is the 'right' of all pupils as future citizens. (ibid., p.10)

A knowledge-led school curriculum relies on the best ideas and enquiries of the specialist communities which give priority to discovering, debating, testing and evaluating new knowledge (Young and Lambert, 2014). This best knowledge is referred to as powerful knowledge (Beck, 2013; Young, 2008, 2013a, 2014e, 2018, 2021; Young and Muller, 2010; Young and Lambert, 2014); in Bernstein's words this

enables students to ‘think the un-thinkable and the not yet thought’ (Young, 2013b). Young and Lambert (2014) maintain that all students are entitled to this knowledge as an educational goal and as a principle of educational justice. Such knowledge enables students to become “‘literate’ in a subject”, involving them into “*acquiring the powers of the knowledge* of that subject” (Young, 2021, p.239).

Many countries have responded to a changing world by opening up the curriculum in a number of ways (e.g., Chapman, 2021; Lambert, 2019; McPhail, 2017; Young and Lambert, 2014). In democratising the curriculum, there have been a variety of unintended consequences (McPhail, 2017; Young and Lambert, 2014; Zipin et al., 2015). One consequence has been to sideline knowledge with an overemphasis on skills in a process-oriented curriculum (Deng, 2018; Hudson, 2018; Lambert, 2018a; Wheelahan, 2010; Young and Lambert, 2014), resulting in “literally a disappearance of knowledge in current global trends in curriculum policy and curriculum planning” (Deng, 2018, p.335). For example, in the subject of music where the mechanism for curricular selection and structure in the past was the musical work, it has now become the development of students’ skills according to their interests (McPhail, 2017). A key concern amongst these consequences has been reduced and fragmented epistemic access (Lambert, 2018a, 2019; McPhail, 2017; Young and Lambert, 2014). The latter contend that a school curriculum which emphasises the interests and experiences of the students, their parents and the locality, weakens the role of subjects as the basis for ensuring that students progress and do not miss out on key concepts. Lambert (2018a) and Young and Lambert (2014) maintain that such a curriculum perpetuates current inequalities especially where students from disadvantaged backgrounds are concerned: “Through this process, subject specialism is undermined and, especially for low-attaining children or those from more deprived socio-economic circumstances, alternative ‘less academic’ curriculum arrangements are often devised” which generate “a particular form of capabilities deprivation” (Lambert, 2018a, p.358).

4.1.2 The role of schools, curriculum and pedagogy

The starting point for the powerful knowledge discussion is therefore the entitlement to knowledge. To adequately fulfil this requirement, the curriculum must be based on the ‘best knowledge we have’ (e.g., Young, 2013a; Young and Lambert, 2014); this is the premise of the idea of powerful knowledge. It is access to knowledge beyond our experience that is the only true source of freedom (Young, 2008; Young and Lambert,

2014), and as such is the ‘entitlement of all’. Such access to real knowledge challenges not only what we know but sometimes even our sense of who we are. If education is to be emancipatory, it has to be based on a break with our experience and our sense of identity. This is never easy - another reason for a far greater acknowledgement of the enormous responsibility teachers are entrusted with (Young and Lambert, 2014). Real knowledge allows those with access to it to question it and the authority on which it is based, nourishing a sense of freedom and excitement (Young 2013b; Young and Lambert, 2014).

One of the major professional tasks of teachers is that of identifying what knowledge is powerful for students at different ages (e.g., Young, 2013b, 2021; Young and Lambert, 2014). I argue that they need also to develop their specialist knowledge in how students can be helped to acquire subject knowledge that they may initially experience as alien to them. This specialist pedagogic knowledge is no less complex or difficult than subject knowledge itself (ibid.).

The pedagogy advocated is one which engages the learner to a committed relationship with knowledge, where students are active learners, freeing them to have new thoughts and even think the ‘not yet thought’ (Lambert, 2018a; Young and Muller, 2010; Young, 2013a). Schools should be special places where children and young people are introduced to knowledge and knowledge making in ways that do not happen in ‘everyday’ places (Lambert, 2018a; Young, 2013a). I contend that they should provide students with opportunities to move beyond their current knowledge and experiences and savour the possibilities that knowledge and a knowledge-based curriculum can offer them.

The confidence teachers have in their subject and pedagogic approach facilitates the relationship between knowledge and their experience. Teachers can then offer students ways of relating to knowledge that is new to them in that it is relevant to their experience. Students can experience the opportunities arising during this process as nourishing and enjoyable (e.g., Lambert, 2018a). I argue that this is the promise of powerful knowledge.

4.1.3 What is the nature of this knowledge?

Such knowledge is powerful “if it predicts, if it explains, if it enables you to envisage alternatives” (Young, 2014d, p.74) and “if it helps people to think in new ways” (Young,

2015, n.p.). It is also powerful because “its concepts … can be the basis for generalisations and thinking beyond particular contexts or cases” (ibid). It differs from knowledge that does not offer the potential knower any specific intellectual resources. Maude (2020), for example, argues that based on the discipline’s major concepts and their application, the powerful knowledge in school geography enables students to think geographically in new ways and formulate generalisations and apply them to new contexts.

Powerful knowledge has three characteristics (Young, 2013a, 2014d):

a) It is distinct from the common-sense knowledge acquired from the everyday experiences of learners. It is not context-specific and tied to the personal experience of students, but context-independent and therefore transferable to situations that are beyond a student’s experience (Young and Muller, 2013). Common-sense knowledge is vital to our everyday lives, but it is also always tied to particular contexts. This knowledge develops through experience as we grow older. It does not require teaching. Powerful knowledge is differentiated from the experiences that students bring to school (Young, 2013a). This differentiation is expressed in the conceptual boundaries between school/institutional and everyday knowledge.

Powerful knowledge “is comprised of sets of inter-related relatively abstract concepts, which take human understanding beyond the level of everyday awareness” (Beck, 2013, p.186). For example, Maude (2020) argues that the key concepts in geography (place, space, environment and interconnection) are characterised by “increasing complexity and abstractness and can be thought of as ‘key’ because they synthesise and incorporate simpler and less abstract concepts, and cannot be subsumed by an even bigger and more abstract one” (p.234). They are powerful because “they teach students new ways of thinking about the world. They may also change a student’s perceptions and values, what they see as important, and even their behaviour” (ibid. p.235).

b) Powerful knowledge is systematic. The concepts are systematically related to each other in groups that are referred to as subjects or disciplines. Powerful knowledge can be the basis for generalisations and thinking beyond particular contexts or cases.

c) “It is specialised, in how it is produced (in workshops, seminars and laboratories) and in how it is transmitted (in schools, colleges and universities)” (Young, 2013a, p.108). Powerful knowledge is knowledge that has been developed by clearly distinguishable groups with a clearly defined focus or field of enquiry and relatively fixed boundaries separating their form of expertise. Such specialised knowledge “is reliable and truthful: indeed, … it is the best it can be” (Lambert, 2014, p.7). It is inevitably non-everyday knowledge (Harland and Wald, 2018).

To generate new knowledge, one needs to make connections between knowledge types (Young, 2008). In the process, a ‘discursive gap’ is created (Young, 2013b), where particular forms of abstraction are required for new meanings to materialise and fill the gap between empirical data and theory building. The most significant outcome of having context-independent theoretical knowledge is the potential to be able to generalise and suggest explanations beyond specific circumstances through an ability to imagine alternatives (Young, 2008). The potential discursive gap is important in understanding how new and original knowledge can be created in research; realising the gap’s potential requires students to have the tools to understand conceptual knowledge structures (Wheelahan, 2010).

4.1.4 Considerations for schools

The idea of powerful knowledge provides a framework for thinking about the decisions that have to be made by schools (Deng, 2018, 2020; Hudson, 2018; Lambert, 2018a; Mitchell and Lambert, 2015; Young, 2021; Young and Lambert, 2014); we “need to think hard about the implications of what Young means by schools needing to ‘provide access to knowledge’” (Lambert, 2018a, p.357). These include what subjects and options are offered to students at different ages, and how teachers facilitate a meaningful encounter between their students and this specialist knowledge. This is what Bernstein (2000) refers to as a ‘pedagogic right’.

Entitlement should result in access. But access to what? A curriculum must provide epistemic access to the best knowledge available in any field of study students engage in (Young, 2013b, 2021; Young and Lambert, 2014). Such access to the curriculum needs to challenge students’ existing ideas and help guide their learning in the search for truth which can be grasped depending on their age and development. Epistemic access refers to the process of learners getting to understand the generative principles

of disciplinary knowledge and addressing what is presently ‘not known’. It is helpful for them understanding ‘how’ one might come to know something (Harland and Wald, 2018; Hudson, 2018). For example, the latter argues that mathematical thinking and associated processes of creative reasoning are central to mathematical know-how and help to make sense of possible cases of high and low epistemic quality in school mathematics.

Young (2021) emphasises that a curriculum based on powerful knowledge, or “a knowledge-rich curriculum”, apart from having “a conceptual basis in academic subjects”, needs to provide access to resources. It needs to be “a resource-rich curriculum” (p.245) characterised by “the availability of the necessary human resources of well-qualified subject teachers and the appropriate material resources such as equipment and specialised accommodation” (p.244). He maintains that “a curriculum based on powerful knowledge is not just a body of knowledge content but a particular distribution of resources - human and material” (p.245). He discusses, for example, how “a poorly resourced school attempting to introduce a knowledge-rich curriculum is going to face insuperable problems, even if it improves its performance ranking” (ibid.).

Teachers are considered as ‘curriculum makers’ (Bustin, 2019; GeoCapabilities, n.d.; Hudson, 2018; Lambert, 2017, 2019; Lambert and Biddulph, 2015; Lambert and Mitchell, 2015). This occurs during those processes at the classroom level where they are engaged in curriculum thinking in practical action involving the ‘trinity of educational practice’, being the subject, the student and the teacher (Lambert and Biddulph, 2015). A teacher needs to make balanced decisions relating to these three interrelated priorities: the nature and purposes of the discipline; the needs, prior knowledge and experiences of students; and their pedagogical approaches. These authors propose that this process of curriculum making is “a signature part of teachers’ identity” (ibid., p.217).

Schools need to consider the relevance given to such general themes as citizenship, the environment and personal and health education, and whether the curriculum or part of it is to be organised on the basis of such themes or falling under the responsibility of different specialist subjects. Schools must also think about the access given in these subjects to powerful knowledge that enables students to progress to higher levels, how such knowledge is made explicit in these subjects, and how the

criteria of powerful knowledge apply in different ways to the sciences, humanities, arts and vocational subjects (Chapman, 2021; Hudson, 2018; Lambert, 2018a, 2019; Young and Lambert, 2014). Reflection about these considerations is facilitated by the Futures model (section 4.1.5). The relevance of the teacher as curriculum maker, for instance, takes shape within the design and enactment of a Future 3 curriculum thinking (e.g., Lambert, 2017, 2018a, 2019; Lambert and Biddulph, 2015).

4.1.5 Futures of school knowledge

The three Futures model offers a way of thinking about the question of knowledge in the curriculum. Three 'futures' of school knowledge have been identified (Young and Muller, 2010; Young and Lambert, 2014):

a) Future 1: Subject "boundaries are given and fixed" (Young and Muller, 2010, p.16) and maintained in an elitist form of knowledge. Such knowledge is treated as largely given and established on the basis of tradition and by the route it offers to high achievers. It tends "to be associated with one-way transmission pedagogy and a view of learning that expects compliance from pupils" (Young, 2014d, p.59). A Future 1 view of knowledge assumes that though the future will be different from the past, it will always be an extended version of the past (Young, 2014d; Young and Muller, 2010).

b) Future 2 represents "the end of boundaries - an over-socialised concept of knowledge" (Young and Muller, 2010, p.18). Subject boundaries are relaxed or removed completely. The principal aim becomes generic outcomes; "in articulating an alternative to the rigidities of Future 1, Future 2 has swung from content-based to skills-based priorities" (ibid., p.22). The selection of content is flexible and is often driven by concerns of immediacy or relevance.

The boundaries between the worlds of school and work are also weakened (Young and Lambert, 2014). There is a shift from perceiving education as worthwhile and learning in itself (the pursuit of knowledge for its own sake) towards an increasingly instrumental view that education is a means to an end. This is usually expressed as the expectation of future employment. This 'socially constructed' view of knowledge underpins Future 2 developments (ibid.). Such a view "easily legitimates a curriculum that celebrates the experience of pupils, whatever that may be rather than the idea that the purpose of schools is to introduce them to knowledge beyond their experience" (Young, 2014c, p.62).

Curriculum designers and/or teachers may yield to Future 2 pressures. For example, under great pressure to perform geography teachers have formulated lessons that have become, in the most extreme cases, free from any meaningful connection to geography as a discipline or system of thought (e.g., Lambert et al., 2016; Mitchell and Lambert, 2015).

c) Future 3: “Boundary maintaining and boundary crossing are the conditions for the creation and acquisition of new knowledge in the emerging global context” (Young and Muller, 2010, p.19). Subject knowledge is thus regarded as dynamic and forward looking, not fixed or given (as in Future 1), nor entirely arbitrary (as in Future 2). A progressive knowledge-led curriculum is implied (Young, 2014a). By participating in the development of such knowledge, subject teachers take on a leadership role as educators with a revised notion of the ‘good teacher’ that embraces knowledge and knowledge production (Mitchell and Lambert, 2015; Moore, 2004). This requires a substantial shift as the common self-image of the ‘professional’ teacher has moved toward the ‘competent craftsperson’ (Moore, 2004).

Young and Muller (2010) discuss that they present a social realist theory of knowledge. Such a theory

> sees knowledge as involving sets of systematically related concepts and methods for their empirical exploration and the increasingly specialised and historically located ‘communities of enquirers’ ... with their distinctive commitment to the search for truth and the social institutions in which they are located (p.14).

Future 1 is represented as an under-socialised theory of knowledge which denies that knowledge is produced in a social context and can be equated with a ‘given’ fact-delivery conception of school. In contrast, Future 2 is over-socialised which denies that knowledge has any objective ‘reality’ which is not socially constructed. Future 1 is reluctant to recognise that subject knowledge changes over time and is taken as given. Future 2 may fail to provide access to the real, objective knowledge needed to access life opportunities, and perversely conceals from the students real-world knowledge that contributes to their education. Future 2 can be superficially attractive, responding to students’ everyday experience, but is no shortcut to educational success (e.g., Mitchell and Lambert, 2015).

A Future 3 curriculum is one where teachers seek to take their students beyond their experience in the most existing reliable ways. Why? On the one hand, Future 3 points to a curriculum of the future and so offers a vision of the future for schools today. It is

an element of all actual curricula which are pressured to lean towards Future 1 and Future 2. In contrast to Future 1, it does not treat knowledge as given but as fallible and always open to change through the debates and research of the particular specialist community. The subjects of a Future 3 curriculum are both supported and challenged by the discoveries of the members of the disciplinary communities that they are associated with and by the research undertaken by the associations of subject teachers with their expertise in how different children learn and what are the best activities that will encourage them to take their learning further. Unlike the openness of knowledge assumed by Future 2, Future 3 knowledge is seen as bounded (it is made within a disciplinary epistemic framework) but also dynamic (changing). Subject conceptual frameworks provide and maintain boundaries which allow for innovation and the acquisition of new powerful knowledge creation to draw from 'outside' the subject without losing the power of the discipline (Mitchell and Lambert, 2015; Young, 2014a; Young and Muller, 2010). It follows that subjects are treated as the most reliable tools for enabling students to acquire knowledge and make sense of the world. It implies that the curriculum must stipulate the concepts associated with different subjects and how they are related.

Besides granting access to powerful knowledge in the school curriculum and consequently promoting social justice (e.g., Young and Muller, 2010), a Future 3 curriculum presents an argument for deeper thought about the role of subject knowledge in teachers' curriculum making (Lambert, 2018a, 2019; Lambert and Biddulph, 2015; Mitchell and Lambert, 2015). A greater conceptual distinction between curriculum and pedagogy is necessitated by Future 3. If curriculum and pedagogy begin to merge without sufficient distinction, the teacher's rationale for content selection, of what to teach, may be overlooked. The 'pedagogic adventure' can become the end in itself, rather than the means to accessing and developing worthwhile and meaningful knowledge to take the student beyond the knowledge gained in everyday life (Mitchell and Lambert, 2015).

4.1.6 Critique of powerful knowledge

Zipin, Fataar and Brennan (2015) critique the concept of powerful knowledge for its focus on the cognitive rather than ethical purposes of schooling and its 'thin' articulation of social justice in postcolonial contexts. Beck (2013) draws attention to the tensions involved in extending powerful knowledge to disadvantaged students.

Catling and Martin (2011) and Yandell and Brady (2016) reiterate the value of experiential knowledge. Rudolph et al. (2018) contend that the concept of powerful knowledge evokes a faith in the 'shine' of disciplinary knowledge without adequately attending to its 'shadow'.

Beck (2013) draws attention to the tensions involved in extending powerful knowledge to all students, especially the disadvantaged ones. 'Tension 1' emanates from the self-referential character of academic knowledge. He argues that students might find it hard to make subjectively meaningful connections between the 'remote' disciplinary worlds and their everyday experience. This could be accentuated if scholarly communities that develop specialised disciplinary knowledge are inward looking and self-absorbed. Another tension concerns the issue of "breadth versus specialisation" (Beck, 2013, p.187). Finding adequate curriculum space for certain aspects of education has been proving notoriously difficult, as well as not being taken seriously by students. Such aspects include equipping young people to understand themselves and empowering them to see through the various forms of distorted communication that shape everyday consciousness. This tension has been intensified by the growing competition for academic success. Beck (2013) argues that the ways these tensions interact sustain existing patterns of educational privilege and exclusion to the detriment of widening epistemic access. Research on school subjects and social inequalities in Australia, for example, suggests that although learning subjects such as physics and mathematics may be intellectually and socially advantageous, "the abstracted detachment required for them produced disengagement by those from poorer backgrounds and reproduced the socially differentiated patterns of success and failure" (Yates and Millar, 2016, p.300).

Beck (2013) agrees that powerful knowledge is knowledge that is empowering. He points out, however, that not all sorts of empowerment through knowledge are desirable. Theoretical and practical sorts of knowledge can empower individuals or groups to manipulate others in ways that are not in their best interests. He argues that "an educationally defensible conception of powerful knowledge would therefore need to appeal to additional criteria in order to exclude such morally repugnant forms of empowerment" (p.184).

Whilst agreeing that disciplinary knowledge is often useful and powerful, Rudolph et al. (2018) claim that 'bringing history back in' to knowledge projects is required for

working towards curriculum and educational justice. The historical reflexivity they advocate is to be based on an understanding of the interwoven nature of the past, present and future; attending to the history that has produced the disciplines that are central to the concept of powerful knowledge is important (ibid.). Colonial relations of power need to be made visible so as not to forget or overlook the power and violence of knowledge, its 'shine' and its 'shadow' side. Rudolph et al. (2018) claim that this is knowledge that can be powerful in its interrogation of racial and colonial violence, rather than in its epistemic reproduction of it. It also allows the consideration of the multiple relationships that occur in the production of knowledge. These include relationships between violence and power, experience and theory, past and present, and between privilege and marginalisation. Young (2021) responds by arguing that while these criticisms "raise important political issues, from the perspective of education they have done little more than shift the argument back from powerful knowledge to 'knowledge of the powerful'" (p.253). He claims that these arguments focus on issues external to the curriculum but do not discuss the curriculum's implications. He maintains that "we have to find a way of combining the two analyses" (ibid.).

While Catling and Martin (2011) agree with the need to 'bring knowledge back in' (Young, 2008), they maintain that powerful knowledge as conceived by Young valorises academic knowledge above the everyday or 'ethno-knowledges' that students bring with them into school. They maintain that Young (2008) portrays academic knowledge "as authoritative and everyday knowledge as naïve" (p.322). While they agree with him that "everyday knowledge should be the basis for teaching and learning" (Young, 2008, p.13), Catling and Martin (2011) criticise him for not considering this knowledge as powerful in its own right. They contend that this privileging of academic knowledge over everyday knowledge is not helpful: "Those who privilege academic knowledge and perceive it as being 'superior' to the 'inferior' everyday knowledge are, in effect, 'othering' and diminishing the everyday, and students along with it" (p.325). They contend that students' (and teachers') everyday knowledge is also a valid form of powerful knowledge, and that its incorporation into the curriculum constitutes a kind of 'liberatory education' (Freire, 1972). This education "seeks to give voice to the suppressed and then to create a dialogue with the aim of co-constructing new knowledge" (Catling and Martin, 2011, p.325). The curriculum

becomes “an articulation of the interrelationship between the two powerful knowledges brought to bear by students and subjects” (ibid., p.329). Thus, the students’ “everyday or ethno-knowledge and understanding is no longer ‘othered’ but becomes the co-core, with the subject at the heart of the curriculum and pedagogy” (ibid.). Roberts (2013, 2014, 2017) argues that providing students with opportunities to link their everyday knowledge with the school subject “is powerful because it respects what students already know” (Roberts, 2017, p.6).

In a similar vein, Yandell and Brady (2016) argue that experience in students’ accounts must not be abandoned in favour of the ‘better knowledge’ that the curriculum provides. On the contrary, “experience is constitutive of the reading that is enacted in the classroom” (p.55) and that learners are agents in constructing their very different readings of a particular text. These authors maintain that truth “is not some pre-existent entity (the best that has been thought or said), nor is it universal; on the contrary, it is inseparable from the concrete, from particular struggles for and over meaning” (ibid.). Meanings are not merely transmitted but also made. The classroom offers a process through which students’ concepts develop in ways that “involve continuous dialectical movement from past to present, from text to lifeworld (and back again)” (p.56).

Zipin et al. (2015) critique powerful knowledge for shunting aside important ways of thinking about knowledge and the curriculum that matter for socially just educational work especially in postcolonial contexts. They contend that through denying processes that sustain selective coding of curriculum to reproduce inequalities, powerful knowledge supports a ‘thin’ conception of justice as mere redistribution of access to empowering knowledge. In the process, complex ethical matters linked to structural power inequalities are avoided (ibid.). They maintain that powerful knowledge emphasises epistemological (cognitive) purposes for schooling in ways and degrees that marginalise axiological (ethical) purposes. Consequently, the conceptions of what constitutes social-educational justice are too thin to meet substantive needs and aspirations among power-marginalised groups seeking better lives through schooling. Zipin et al. (2015) contend that “the capacities for bringing ethics-and-knowledge back into focus are now greatly needed” (p.35).

Concurring with Deng (2015), Hudson (2018), Lambert (2018a) and Gericke et al. (2018), I refute the dichotomisation suggested by the notion of powerful knowledge

that curriculum (‘what to teach’) can be separated from pedagogy (‘how to teach’). Young fails to discuss how powerful knowledge has to be unlocked and transformed in the classroom to assist the flourishing of students’ learning (e.g., Deng, 2015). Hudson (2018) criticises the notion of powerful knowledge as overlooking the crucial role of subject didactics. He claims that a major role of subject didactics is to research the boundary between disciplines and school subjects and to research the processes of transformation associated with them. Lambert (2018a) contends that a focus on knowledge alone “can easily lead to a kind of navel-gazing that is centred on challenging philosophical debates about the meaning of knowledge”, “risking stalling progress on broader questions, such as how can teachers make specialist, often abstract, knowledge available” (p.357). This view is also supported by Gericke et al. (2018) who view the questions ‘what to teach’ and ‘how to teach’ as interrelated in didactical research. They contend that to analyse the powerful knowledge within school subjects there is the need “to study its processes of transformation and address the why question (‘why to teach’) in addition to the what and how questions” (p.429).

4.2 Knowledge bases for teaching

Teaching is a complex activity drawing on many kinds of knowledge (e.g., Banks et al., 1999, 2005; Deng, 2018, 2020; Durden, 2020; Hashweh, 2005; Mishra and Koehler, 2006; Moore, 2004; Shulman, 1987; Stobart, 2014; Turner-Bisset, 2001). This section discusses how various knowledge bases for teaching combine together in different ways to provide students with access to knowledge.

4.2.1 Shulman’s notion of PCK

Shulman (1986a, 1986b, 1987) developed the idea of PCK arguing that what was missing in research on teachers' knowledge was the study of the interaction between subject content and pedagogy. He claimed that these were being treated as mutually exclusive domains. His vision was to redress a perceived imbalance between teachers’ knowledge of subject content and their lack of specific knowledge of how to transform it into a repertoire of representations that enhance students’ learning (Deng, 2018, 2020; Meyer and Timmermans, 2016; Neumann et al., 2019; Shulman, 2004, 2005).

In his two papers, ‘Those who understand: Knowledge growth in teaching’ and ‘Knowledge and teaching: Foundations of the new reform’, Shulman formulated a

relationship between content knowledge and pedagogical knowledge. He emphasised the existence of a distinctive form of teachers' professional knowledge: PCK. This has been represented diagrammatically as in Figure 2. It is the interplay between pedagogy and content, and the transformation of content into pedagogically powerful forms. It contains within it

> the most regularly taught topics in one's subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations - in a word, the ways of representing and formulating the subject that make it comprehensible to others. (Shulman, 1986b, p.6)

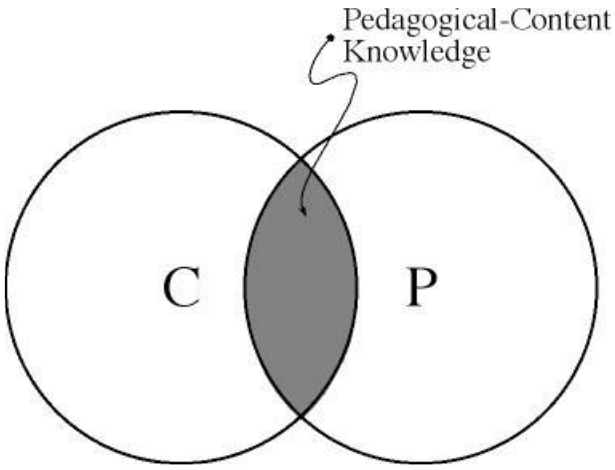

Figure 2. Pedagogical Content Knowledge (Shulman, 1986b, 1987)

Shulman (1987) claims that PCK is of special interest because

> it identifies the distinctive bodies of knowledge for teaching. It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction. (p.8)

The value of this notion lies in the fact that it is as an epistemological concept that usefully blends together the traditionally separated knowledge bases of content and pedagogy (Mishra and Koehler, 2006; Neumann et al., 2019). I concur with Shulman's judgement that PCK is the most precious possession of a teacher and with Kind and Chan (2019) who contend that "acquiring PCK of sufficient depth and quality to impact student learning positively lies at the heart of teacher education and professional development" (p.975).

Shulman (1987) identifies seven knowledge bases needed for teaching: content knowledge, general pedagogical knowledge, curricular knowledge, pedagogical content knowledge, knowledge of students, knowledge of educational contexts and

knowledge of educational ends, purposes and values. This represents a refinement of the concept of PCK and places it as a knowledge base of equal status with the others (Unwin, 2007).

A key notion implied by PCK is that of representation. There are two sets of ideas about this notion. The first set is proposed by Shulman (1986b). Representation is defined as the ways of communicating concepts and processes of a subject discipline. For Shulman, representation is part of transformation: the all-important process of turning subject knowledge into knowledge for teaching. The second set of ideas come from Bruner (1970). His argument is that there are three characteristic ways of representing the word: enactive, iconic and symbolic representations. Enactive representation is understanding by activity, by doing something actively. Iconic representation is understanding by pictures, maps and diagrams. Symbolic representation is understanding through the use of symbol systems such as spoken and written language, mathematical symbols or musical notation. Bruner argues that students first come to understand and represent the world enactively, then iconically and then through symbol systems. He claims that adults use all three forms of representation and move back and forth through them as occasion demands. Turner-Bisset (1997, 2001) argues that teachers might use all three forms of representations when thinking about what kinds of representations to use for particular age-ranges to teach a particular idea or concept.

Shulman (1987) also contends that in order to represent the content, teachers need to ‘prepare’, ‘select’, ‘adapt’ and ‘tailor’ the representations for students’ needs. ‘Preparation’ is done through examining and critically interpreting the materials of teaching in terms of the teacher's own understanding of the subject matter (ibid). ‘Selections’ take place when the teacher draws upon a repertoire of approaches or strategies of teaching to represent the content knowledge. Such a repertoire can be rich and varied. ‘Adaptation’ involves the process of delivering the represented material according to the needs of the learners. When a teacher ‘tailors’ his/her teaching, it involves delivering appropriate representations to particular students or groups of students (Turner-Bisset, 2001). Shulman (1987) maintains that knowledge representations by teachers involve all the four processes discussed above: preparation, selections, adaptation and tailoring for students’ needs. He claims that

such representations help teachers communicate their understanding of the subject knowledge (ibid).

PCK as proposed by Shulman has been criticised of being static in that it does not perceive teachers as developing their PCK as they mature in the teaching profession (e.g., Banks et al., 1999, 2005; Cochran et al., 1993; Kind and Chan, 2019). Such a static model implies a teacher-centred pedagogy rather than a learner-centred one (Banks et al., 1999, 2005; Kind and Chan, 2019) and that teacher education needs to ensure that student teachers learn a prescriptive set of teaching techniques so that they gradually develop fixed professional knowledge from these (Kind and Chan, 2019). Research also indicates that teachers experience difficulty in attempting to articulate the links between practice and knowledge (e.g., Hashweh, 2005; Kind and Chan, 2019; Meyer and Timmermans, 2016). In the first place, they may not be motivated to do so, considering the numerous competing demands of their teaching duties (e.g., Kind and Chan, 2019). They may also be unaware of the tacit nature of PCK and the elusiveness involved to articulate it, "hindered by perceptions of both an apparently non-existent language to express it and a conceptual structure within which to organise it" (Meyer and Timmermans, 2016, p.31).

4.2.2 PCK variations

Since its introduction, PCK has become a widely useful and used academic construct (e.g., Deng, 2018, 2020; Davies and Brant, 2006; Hashweh, 2005; Kind and Chan, 2019; Mishra and Koehler, 2006; Neumann et al., 2019; Unwin, 2007). This section discusses three other articulations of the conceptualisation of PCK.

Arguing about the advent of new technologies, Mishra and Koehler (2006) claim that it is the technology that drives the kinds of decisions teachers make about content and pedagogy. By introducing 'technology knowledge' as an explicit component, they propose the notion of technological PCK (TPCK). This notion is a useful addition to the academic debate about the critical engagement with the use of learning technologies (Mishra and Koehler, 2006; Unwin, 2007).

Mishra and Koehler (2006) contend that when introducing technology to the educational process, there exists the "tendency to only look at the technology and not how it is used" (ibid., p.3). They note the importance of technological knowledge (TK)

overlapping with content and pedagogy as shown in Figure 3. A new triad, TPCK, emerges.

This model introduces four 'new' knowledges: technology knowledge (TK), technological content knowledge (TCK), technological pedagogical knowledge (TPK) and TPCK. The latter brings together TCK, TPK and PCK. It represents a class of knowledge that is central to teachers' work with technology. Mishra and Koehler (2006) claim that "quality teaching requires developing a nuanced understanding of the complex relationships between technology, content and pedagogy, and utilising this understanding to develop appropriate, context specific strategies and representations" (p.14).

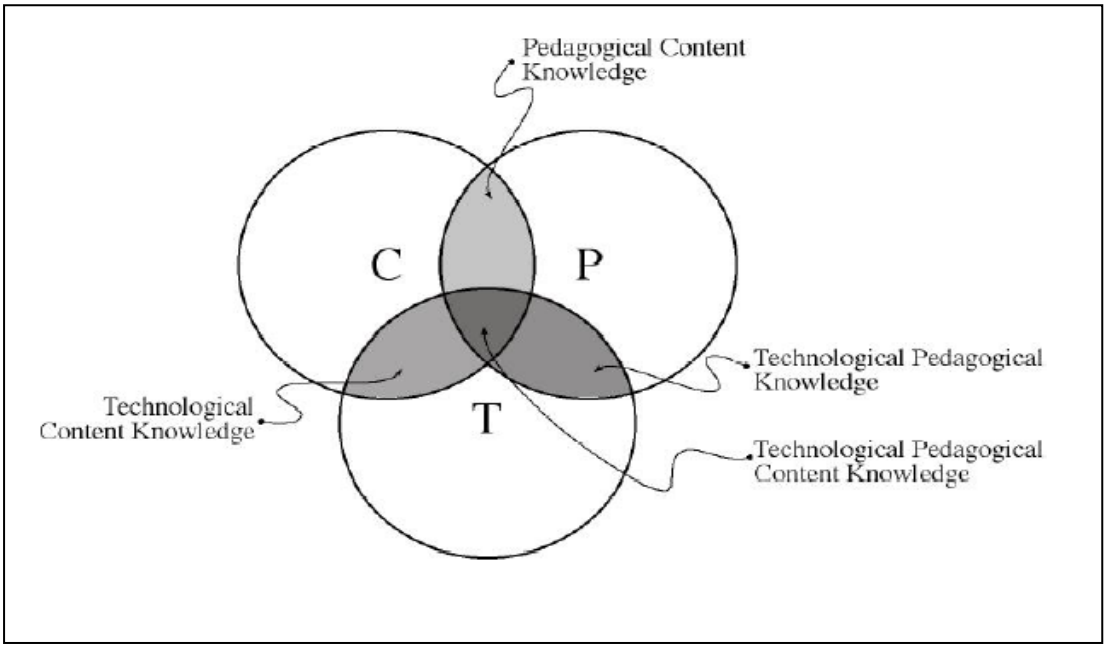

Figure 3. Technological Pedagogical Content Knowledge (Mishra and Koehler, 2006)

One should be critical and cautious about utilising the TPCK framework for designing and evaluating courses (e.g., Unwin, 2007). This author argues that whilst this framework sheds light upon the complexities and nuances that arise from using technology in the classroom, it "fails to mention the importance of considering educational contexts, the role of the learner and their previous knowledge" (ibid., p.243). Unwin (2007) claims that

> overall the potential (positive) impact of technology knowledge is perhaps overstated, the suggested radical change to the nature of education neglects the

> issues of power, authority, and the often-narrow outcomes and competence-based agenda within many educational contexts. (p.245)

Hashweh (2005) proposes another term for PCK, teacher pedagogical constructions (TPCs), claiming that it better conveys the meaning and development of PCK. He perceives PCK "as a collection of teacher professional constructions, as a form of knowledge that preserves the planning and wisdom of practice that the teacher acquires when repeatedly teaching a certain topic" (p.290). Each TPC is developed by teachers "as a result of repeated planning and teaching of, and reflection on the teaching of, the most regularly taught topics" (p.277). It arises from "cases of repeated experiences of teaching a familiar topic" (p.289) and can be explored in various ways to evaluate its theoretical bases, its technical dimensions, the values embedded in it and its utility and functionality. Hashweh (2005) brings an analogy from chemistry to further explain how PCK is composed of TPCs: each of these constructions is a molecule and PCK is the mixture of different molecules. By viewing PCK not as one whole unit but as a collection of TPCs, he maintains that PCK is defined more precisely and its relations to other knowledge entities is clarified, facilitating the investigations of PCK.

Another articulation of PCK comes from Kind and Chan (2019). This is illustrated in Figure 4. The components of PCK, CK and PK are shown next to the brackets on the right-hand side. The structure is wedge-shaped illustrating that as teachers grow from 'novice' to 'experienced', their PCK develops and matures. PK includes sub-components which are present consistently in research findings about PCK. These are instructional strategies, classroom management, organisation of materials and resources, and knowledge of assessment and of curriculum. These support teacher development over time as the range of components within a teacher's knowledge base deepens. The dotted lines intend to indicate that the types of knowledge interact. The widths of each component suggest greater increases in knowledge of instructional strategies and classroom management than the other components. CK comprises facts and concepts.

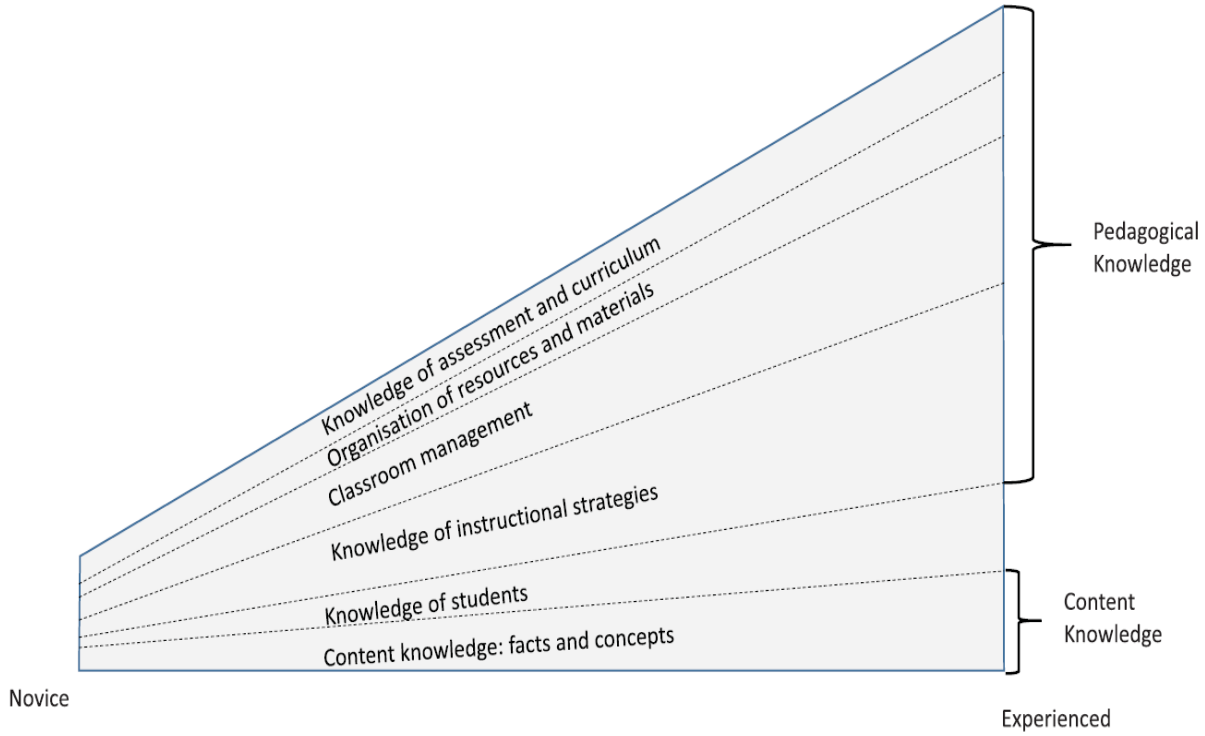

Figure 4. PCK as articulated by Kind and Chan (2019)

Recognising the need for a mediating link between PK and CK, knowledge of students is proposed as a 'bridging' component, being a consistent factor that impacts PCK. Shulman (1987) listed 'knowledge of learners and their characteristics' as a separate teacher knowledge base, assisting teachers into making appropriate judgements concerning the choice of what instructional strategies to use for conveying specific CK to a particular group of students.

The structure illustrates how the amalgam between CK, PK and knowledge of students comes to inform teachers' practices. It also explains how novice teachers start with a strong CK but relatively weak PK. Over time, PK is much more likely to develop than CK.

4.2.3 Teachers' professional knowledge and expert teaching

This section discusses the model of teachers' professional knowledge proposed by Banks, Leach and Moon (1999) and the notion of expert teaching and learning as contributed by Turner-Bisset (2001) and Stobart (2014).

Banks et al. (1999) propose a framework through which teachers' professional knowledge can be conceptualised. Their argument is that teachers develop and

integrate these aspects of professional knowledge: subject, school and pedagogic knowledge and their personal constructs. Figure 5 represents their inter-relation.

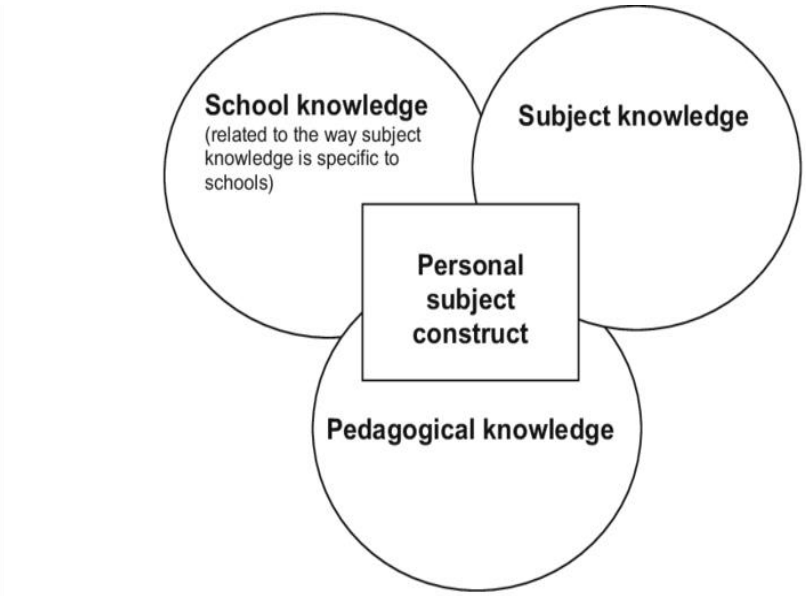

Figure 5. Teachers' professional knowledge (Banks et al., 1999)

'Subject' knowledge encompasses the essential questions of the subject, the network of concepts, the methods of enquiry, the theoretical frameworks, the techniques for acquiring and verifying frameworks, symbolic systems, vocabularies and mental models. Banks et al. (1999) emphasise "the dynamic, process-driven nature of subject knowledge" (p.94). 'School' knowledge is "related to the way subject knowledge is transformed for schools and includes an understanding of the historical and ideological construction of that school knowledge" (Banks et al., 1999, p.94). It is a separate but linked body of knowledge which primarily relates to curricular issues and subsumes the curricular knowledge of Shulman (1986). It is the transformation of the subject knowledge into curricular related outcomes (Banks et al, 1999; Leach and Moon, 2000). 'Pedagogic' knowledge is rooted in an understanding of the crucial relationship between subject knowledge, school knowledge and knowledge of learners. By drawing on these types of knowledge, teachers translate their knowledge of subject matter into instructional representations. Pedagogic knowledge represents the skills and approaches teachers use to deliver the subject. It includes the setting of learning goals, the selection of knowledge that is the subject of the learning, and the selection of resources and learning and assessment activities. Green (2006) claims that the

“engagement with issues of pedagogy further broadens notions of subject knowledge and the formation of subject construct” (p.284). Central to this process are the personal constructs of teachers. They include a complex amalgam of past knowledge and experiences as learners, a personal view of educational goals and what constitutes ‘good’ teaching, and the values, beliefs and assumptions about the subject that they have developed over time (Abbot, 2019; Banks et al., 1999, 2005; Green, 2006; Leach and Moon, 2000). These constructs underpin teachers’ professional knowledge and play a part, for example, in shaping their sense of the kind of teacher they want to become and the methods they feel comfortable to employ (Banks et al., 1999; Green, 2006).

Banks et al. (1999) maintain that it is ‘the active interaction’ of subject knowledge, school knowledge, pedagogic knowledge and personal constructs that generates teacher professional knowledge (p.95). This “development of professional knowledge is a dynamic process” (Banks et al., 1999, p.96) which occurs in a community of practice (Banks et al., 1999, 2005).

Turner-Bisset (2001) offers another notion of teaching as a knowledge-based profession. Teachers are perceived to work and develop towards a state of expertise in the kinds of knowledge, skills and processes needed for ‘expert teaching’. Her argument is that “expert teaching is a synthesis of knowledge, skills and understanding from all of the knowledge bases” (p.160). The different kinds of knowledge bases underpinning the act of teaching are illustrated in Figure 5 (Turner-Bisset, 2001).

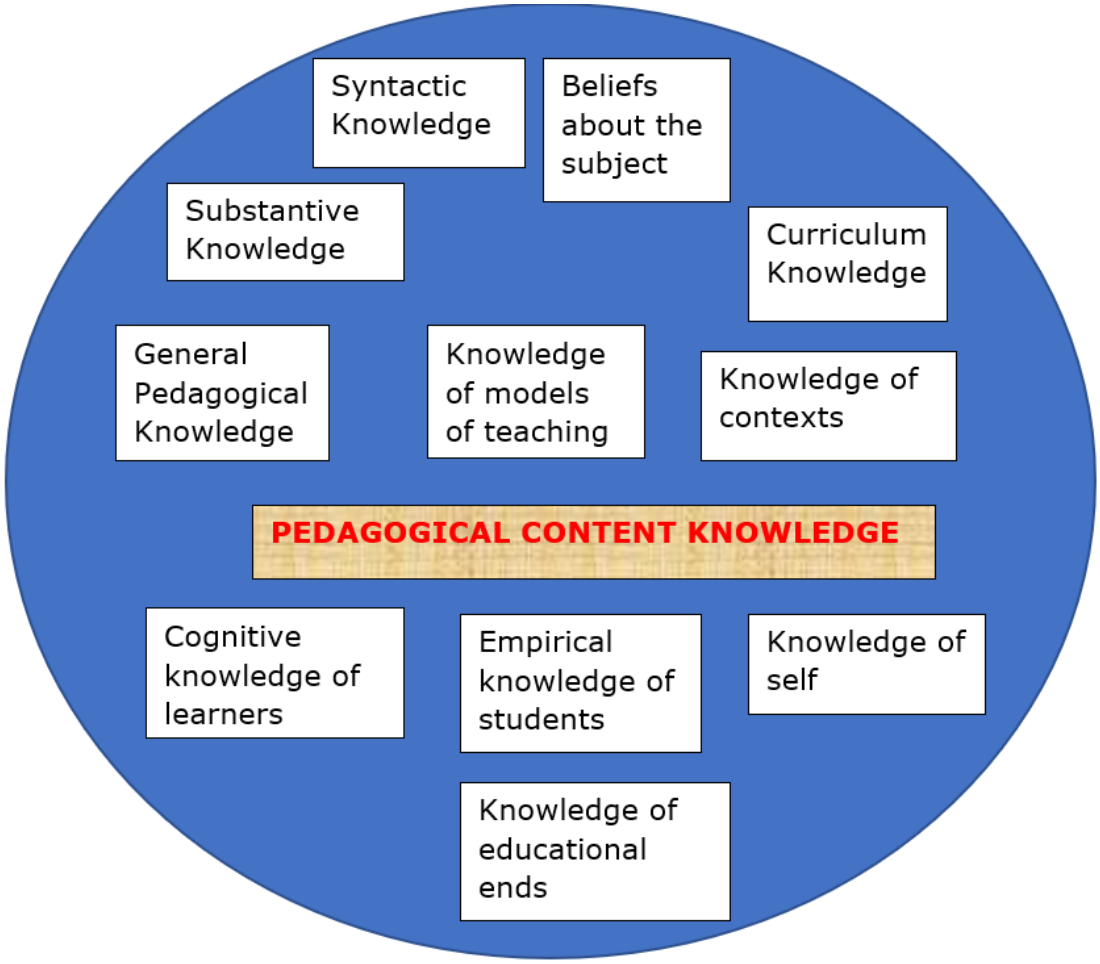

Figure 6. Knowledge bases for teaching (Turner-Bisset, 2001)

Turner-Bisset (2001) argues that for each subject taught its substantive and syntactic structures need to be examined. The dominant paradigms and modes of enquiry or creation must be firmly grasped by teachers, so that they are able to devise lessons which reflect the parent discipline of the subject. They need to be knowledgeable with the substantive structure of the subject they teach. As far as syntactic structures are concerned, they need to be conversant with the skills and processes that are fundamental to the subject. It is useful to comprehend the subject in ways which might have been hidden before, considering the essential substance of the subject, its organising paradigms and key concepts, and the syntactic structures of how knowledge and understanding are produced. Teachers need also to be conscious of their set of beliefs which underpin their teaching (Turner-Bisset, 2001, 1999b).

Another knowledge base, curriculum knowledge, is the knowledge of the curriculum in its widest sense. Turner-Bisset (2001) argues that expert teachers need knowledge and understanding of curriculum knowledge related to subject knowledge for teaching,

knowledge of the curriculum as differentiated subjects and integrated subjects, and a critical understanding of the curriculum. Shulman (1986b) characterises curriculum knowledge related to subject knowledge for teaching as 'the tools of the trade' for teaching: programmes of study, schemes of work, and the materials and resources. Indeed, expert teachers may utilise anything as curriculum materials; they use their deep subject knowledge and other knowledge bases to devise, adapt, select and create materials for teaching.

Teachers need to reflect on three sets of educational ends and how they impact their teaching: the educational ends of society, of schools, and of self as teacher (Turner-Bisset, 2001). The educational ends of society are the legal requirements, enshrined in government legislation. Teachers reflect on the purposes of secondary education and the traditions on which it is built. Regarding the next layer of analysis, that of school aims, most schools have some sort of mission statement. This sets out what the school aims to achieve for its students' development and the values it aims to cultivate, because "nothing in a school is *value-free*" (Abbott, 2019, p.21). Teachers need to examine these school's educational ends and values, and attempt to match them against the third layer of educational ends: one's own (e.g., Abbott, 2019; Turner-Bisset, 2001). They need to be aware of their own values, their perceptions of secondary education and its purposes. Abbott (2019) claims that "teachers and schools cannot afford to leave unexamined questions about what values underlie their practices and how widely those values are exposed by the school community" (p.18).

Turner-Bisset (2001) argues that expert teachers are knowledgeable about theories of teaching and learning. Research shows that in the absence of such models, student teachers and beginner teachers tend to fall back on what they have experienced in their schooling (e.g., Calderhead and Robson, 1991). The expert teacher values the knowledge of a whole range of theories and models of learning to inform one's planning and teaching. Consequently, one's options for enabling children to learn increases, and the different theories offer a framework by which one can analyse one's own practice. Eraut (1994) contends that public theories such as Piagetian theory or Vygotsky theory may be discussed and criticised without affecting teachers' practice since they may not ever get used.

Another knowledge base, general PK, refers to the broad knowledge about teaching gained from teaching experience (Turner-Bisset, 2001). Shulman (1986b) referred to

“the knowledge of generic principles of classroom organisation and management” that appear to transcend subject matter (p.11). Turner-Bisset (2001) argues that expert teachers reflect on the extent and variety of their strategies, their clarity, efficacy, and enjoyability. They employ a wide range of teaching approaches and strategies to engage their students in learning. She coins the term ‘pedagogical repertoire’ (ibid., p.70). Two aspects are involved. One relates to the approaches, activities, examples, analogies and illustrations for representing facts, skills, concepts, beliefs and attitudes to others. The other aspect refers to skills and strategies used as an integral part of these approaches. These include storytelling, drama, role-play, simulation, demonstration and playing games.

Knowledge of educational contexts is the type of knowledge required at the classroom, school and community levels (Turner-Bisset, 2001). She agrees with Kind and Chan (2019) who maintain that “‘great’ teachers are fully aware of ‘what works’ in their settings, applying pedagogical reasoning in specific contexts” whilst having an understanding of the forces which shape them (ibid., p.973). Similarly, Eraut (1997) contends that expert teachers possess ‘situational understanding’ - the ability to adequately assess a situation (p.553). Since “no educational process is context-free” (Unwin and Yandell, 2016, p.22), knowledge of all of these contexts provides teachers with a sense of perspective. They can be aware, for instance, of how political initiatives can impact on their daily practice and voice their professional judgement regarding any unsuitable initiatives. Moore (2004) further argues that it is because of this argument of ‘situatedness’ that teachers should never be held “overly accountable for social difficulties over which they may have little or no control” as their actions are both “historically/socially produced and historically/socially contextualised” (p.26).

The area of knowledge of learners constitutes the empirical and cognitive understanding of students. Empirical or social knowledge of students includes the knowledge of what students of a particular age range are like, their social nature, their interests and preoccupations, how contextual factors can affect their behaviour and learning, and the nature of the child-teacher relationship. Expert teachers reflect about how this knowledge affects the selection of teaching approaches and their relationships with the students. Cognitive knowledge of learners includes two elements. The first are generic knowledge of theories of development which informs practice. The other element is knowledge of a specific group of learners. It provides

knowledge about the skills and processes of differentiation for differing students' abilities.

Shulman does not include knowledge of self in his list of categories of the knowledge base for teaching; other researchers do however indicate the importance of this knowledge base (e.g., Lampert, 1984; Kagan, 1992; Moore, 2004; Stobart, 2014). Turner-Bisset (2001) claims that since teaching is a profession which demands a heavy personal investment, knowledge of self "is an essential knowledge base, for without it, teachers cannot engage fully in the process of reflection which can greatly aid teacher development" (p122). She concurs with Moore (2004) that, through reflection, teaching contexts and experiences can be a source of professional growth. They maintain that authentic reflection is critical and challenging, seeks out alternatives, and contributes to development or change. By exploring and reflecting upon the emotions that teaching generates in oneself, teaching assists character-building. For example, one needs to cultivate courage and determination to persevere.

The argument of Turner-Bisset (1997, 2001) is that during an act of teaching different kinds of knowledge bases combine in various combinations to generate an overarching knowledge base, PCK. This knowledge is organised at a deep, principled level (Turner-Bisset, 2001; Stobart, 2014). Whereas PCK as conceptualised by Shulman (1986a, 1986b, 1987) is the amalgam of subject matter knowledge and general PK, in the model proposed by Turner-Bisset it is the blending of the knowledge bases which contribute towards a form of PCK that underpins expert teaching. Her argument is that during an expert act of teaching, teachers employ the full amalgam of PCK, demonstrating the richness, complexity and interconnectedness of the knowledge bases. Turner-Bisset claims that the vision of knowledge provided by this model is not a static but a dynamic one, since teaching knowledge is constantly revisited through the interaction of the knowledge bases, resulting in higher-quality teaching.

Stobart (2014) scrutinises the literature about how experts learn and applies it to teaching and learning. He claims that ability is developed through learning and deliberate practice and advocates teaching methods, classrooms and schools that provide opportunities for all. He discusses five expertise themes: the provision of opportunities, making high demands, deliberate practice, deep knowledge and reflective learning.

This author argues that experts respond to the opportunities with which they are presented and develop the motivation to succeed. Teachers and schools need to create and develop opportunities that provide learners with the spark in the area that interests them. In this regard, Kind and Chan (2019) claim that 'successful teachers' possess a "flexible PCK that adapts quickly in classroom settings as they see students' varied responses to planned instruction" (p.975). The expert teacher and school should offer all students a chance to be expert learners. Teachers are also encouraged to become expert in teaching.

Expert teachers develop high expectations and deeper approaches to learning for all their students irrespective of their ability, who are then educated to think for themselves (Stobart, 2014). From the expertise literature emerges the theme of practice being strenuous yet enjoyable. This 'playfulness' in expert teaching and learning enables teachers to enact deep learning which is enjoyable, humorous and joyful (Stobart, 2014; Tomlinson, 2014). Problem-based learning is recommended as a core teaching method where groups of students are presented with situations and asked to propose the ways forward (ibid.).

Stobart (2014) argues that it is with deliberate and purposeful practice that persons become expert in a field. They undertake risks that others do not take in order to practise difficult operations and then perform them effortlessly. For teachers, risk-taking involves going beyond the conventional routines to adopt strategies that ensure deep understanding (Stobart, 2014). This includes cultivating a classroom climate where getting something wrong is seen as productive rather than as a humiliation (Mizzi and Bartolo, 2007; Stobart, 2014). Students are educated not to be afraid to ask questions because they may look ignorant or foolish. This environment enables students to move from their comfort zone into the learning zone (Kyriacou, 2009; Stobart, 2014). This is the zone in which they are stretched to master new skills and knowledge. Another aspect of this expert teaching is linking what is learned to what is already known, starting in the comfort zone and then moving into the learning zone.

Experts possess an organised knowledge base which assists them to assess situations adequately. Stobart (2014) argues that teachers' expert knowledge is organised along the same lines. It is the product of using experience to develop frameworks in which to make sense of both familiar and unfamiliar information. Eraut (1997) refers to this as 'situational understanding' (p.553). Shulman (1986b) argues

that such professional judgment is the hallmark of any learned profession. Experts also possess a mental framework that allows them to perceive the big picture (Stobart, 2014). They are able to evaluate a situation and develop strategies to deal with it. Expert teaching and learning involves understanding the bigger picture in order to make sense of the detail. Expert teachers possess a clear sense of learning progression and are able to provide effective feedback (e.g., Jephcote and Abbott, 2005a). This in turn leads to self-monitoring skills, which allows them to assess their performance (Stobart, 2014). Shulman (1986b, 2005) reinforces this point by claiming that teachers become masters of procedure, content and rationale, and are able to provide explanations why something is done. They develop the expertise that allows them to make clear to their students what is being learned (Stobart, 2014). This presupposes that they are knowledgeable about the content and are able to communicate this to their students (ibid). He uses the term 'adaptive expertise' - the ways teachers adapt their lessons to respond to their students' needs.

Expertise involves constant reflective learning. If students and teachers are to become expert learners and teachers, they need to reflect upon their teaching and learning (Brant, 2006b; Eraut, 1994; Stobart, 2014). It is often from this process that creative contributions emerge (Stobart, 2014). One of the hallmarks of expert learning and teaching is receiving and giving formative feedback. Expert learners are able to give themselves feedback that allows them to adjust their performance, thus maturing into independent and self-regulated learners (Eraut, 1994; Stobart, 2014).

Stobart (2014) claims that if teachers expect their students to become expert learners, they need to become expert teachers themselves. Consequently, they ensure learning which brings about "significant changes in capability or understanding" (Eraut, 1997, p.556). Such learning changes the way students think and has a lasting impact (Brant, 2006b; Davies and Brant, 2006).

4.3 Conclusion

This chapter has discussed the literature relating to notions which have assisted me in exploring economics education at secondary school level: powerful knowledge and the knowledge bases for teaching. These provide insights into the knowledge areas and teaching and learning processes involved, inviting teachers to reflect upon the processes that satisfy the students' entitlement for access to knowledge. Powerful

knowledge, for example, uses economics knowledge to challenge students and as an opportunity to provide learning experiences that move them beyond their current knowledge and experiences; “teaching which does not change what students think is unlikely to have a lasting impact” (Brant, 2006, p.54).

The next chapter discusses how a Future 3 secondary school economics curriculum, underpinned by economics threshold concepts, powerful economics knowledge and knowledge bases for teaching, would provide teachers with a way of thinking through the economics curriculum. They could use their expertise to interact with this curriculum and develop the appropriate pedagogy that facilitates their students’ engagement with powerful disciplinary knowledge in economics.

5. A Future 3 Economics Curriculum

This chapter brings together the literature review chapters by discussing the aspects of powerful disciplinary knowledge in economics and how a Future 3 economics curriculum might look like.

Chapter two has analysed the situation of mainstream economics. The discipline is distinct from school economics but is an educational resource and a source of subject matter (e.g., Kitson, 2021; Mitchell and Lambert, 2015; Young, 2014e). This second chapter of this thesis has discussed how economics, including that taught at secondary school, is dominated by the neoclassical school of economic thought and the disarray it has brought about, such as a heavy reliance upon positivism and problematic ontological and epistemological assumptions. I argue in favour of economics being conceptualised as a social science. The resulting insights for pedagogy include teachers being aware of the grip of neoclassical economics, perceiving models as explanatory devices, exploring reality and adopting a pluralist approach whilst developing criticality of thought, cultivating values, and enhancing citizenship education and financial and economic literacies.

Chapters three and four explore the literature relating to the three constructs which assist into exploring secondary school economics education: threshold concepts, powerful knowledge and the knowledge bases for teaching. These provide insights into the knowledge areas and teaching and learning processes involved, inviting teachers and researchers to reflect upon the processes that underpin economics education. The construct of threshold concepts provides insights into why some students find it troublesome to understand particular concepts and into why certain students undergo a transformational or even creative experience in the liminal space of learning. The notion of powerful knowledge uses disciplinary knowledge in economics to challenge students and as an opportunity to provide learning experiences that move them beyond their current knowledge (e.g., Young, 2018). A teacher is invited to ask: “Does this curriculum take my students beyond their experience and enable [them] to envisage alternatives that have some basis in the real world?” (Young, 2013a, p.106). This is the definition of powerful knowledge adopted by this study, arising from the students’ entitlement or access to knowledge.

There is a paucity of research evidence and theorisation in secondary school economics education (Brant, 2015; Brant and Panjwani, 2015; Davies and Brant, 2006; Shanks, 2020), especially in the area relating to powerful knowledge and pedagogy in economics. For instance, I encountered only one peer-reviewed study about powerful disciplinary knowledge in economics, Modig (2021). This researcher explores powerful knowledge in economics in the context of higher education, discussing how opportunity cost, interest, marginal concepts, demand and supply, inflation and GDP/growth are concepts regarded by Swedish scholars of economics as relevant. Due to this lack of theorisation, this chapter starts by exploring research that attempts to identify powerful knowledge in other school subjects. It then explores the implications to the specific case of school economics regarding the economic concepts and forms of economics knowledge that might be regarded as powerful according to Young's definition of powerful knowledge, developing a conceptual framework that will be applied to economics education and to the rest of the thesis. If economics is to contribute to a Future 3 curriculum, it must be able to demonstrate that its knowledge can be powerful in the ways identified by Young.

5.1 Powerful disciplinary knowledge in school subjects

This section reviews the literature that identifies powerful knowledge in geography, history, physics and mathematics education. These are disciplinary specialisms in which research has been carried out to respond to the question concerning the nature of powerful disciplinary knowledge.

5.1.1 Geography education

Maude (2016, 2018, 2020) examines the characteristics of powerful knowledge in geography and what powerful knowledge may enable young people to do and think as a result of engaging in formal geographical education. He contends that this "alternative way of interpreting the concept, one that is about what the knowledge does" (Maude, 2018, p.180), is prominent in Young's writings. Maude illustrates this aspect by the following two statements from Young:

> Powerful knowledge refers to what the knowledge can do or what intellectual power it gives to those who have access to it. Powerful knowledge provides more reliable explanations and new ways of thinking about the world and acquiring it and can provide learners with a language for engaging in political, moral, and other kinds of debates. (Young, 2008, p.14)

> Knowledge in the sense we are using the word in this book allows those with access to it to question it and the authority on which it is based and gain the sense of freedom and excitement that it can offer. (Young, 2014b, p.20)

Maude's argument is that "these descriptions, and others by Young, focus on what powerful knowledge can do for those who have it, and not on what it is like and how it is produced" (Maude, 2018, p.180). He argues that these two ways of describing powerful knowledge are interrelated: the knowledge that gives young people these powers is likely to be derived from the knowledge that is the 'best' available at present from epistemic communities (Young, 2008).

In his application of powerful knowledge to the specific case of school geography, Maude (2016, 2018, 2020) adopts "the second view of powerful knowledge, i.e. about the intellectual powers that knowledge may give students" (Maude, 2016, p.72). This is "an alternative way of describing and identifying powerful knowledge … by the intellectual power it gives to those who have it rather than by how it is produced" (Maude, 2018, p.179).

Maude (2016, 2018) discusses five types of knowledge in geography education that he suggests are potentially powerful:

1. knowledge that provides students with 'new ways of thinking about the world';
2. knowledge that provides students with powerful ways of analysing, explaining and understanding the natural and the social worlds;
3. knowledge that gives students some power over their own knowledge;
4. knowledge that enables young people to follow and participate in debates on significant local, national and global issues; and
5. knowledge of the world.

Lambert (2017a) endorses this approach. He argues that rather than "search for a list of content that might purport to be definitive", Maude (2016) "focuses on the *characteristics* that make (geographical) knowledge powerful in the first place, and then on the kind of 'power' this knowledge gives to those who possess it" (Lambert, 2017a, p.134). Maude's argument follows that of Young and Muller (2014) when they write about the enabling power of the social sciences in general as providing

> generalisations that are tied, sometimes only weakly, to specific contexts; they generate facts grounded in the relatively objective methods of their peer

> communities. Their findings become a resource for debates about alternative policies, and they contribute in some cases to a society's conversations about itself. Furthermore, they make testable predictions, albeit in most cases as probabilities not certainties, and remind policy makers and politicians that the consequences of their decisions may be more 'powerful' than their intentions. (p.62)

This quotation offers a way of thinking about "both the 'how much' and 'what content' issues by its reference to 'generalisations' which provide a 'resource for debates about alternative policies' and which contribute in some cases to 'a society's conversations about itself'" (Kitson, 2021, p.41).

Whilst highlighting Young's definition of powerful knowledge as "knowledge that gives students the intellectual ability to analyse, explain, predict, evaluate and think about the world in ways that are beyond their personal experience" (Maude, 2020, p.232), Maude (2020) focuses on two aspects of this powerful knowledge. These are the use of concepts to think in new ways and the ability to make generalisations and apply them to new contexts. He argues that both these types of powerful knowledge are based on geography's concepts, "because these are what we think with" (ibid., p.233). He discusses the geographical concepts of place, space, environment and interconnection that he claims produce powerful knowledge, and how they teach students new ways of thinking about the world, and the ability to formulate and apply generalisations to understand, explain and predict beyond the limits of the students' personal experience.

The GeoCapabilities project and its publications further contribute to exploring powerful geographical knowledge (e.g., Bustin, 2019; Lambert, 2017a, b; Lambert et al., 2015). The project's "overall purpose is to propose an approach to express the core role geography plays in producing the educated person" (Lambert et al., 2015, p.724). Its focus is "on developing conceptual understanding and the capability to think geographically, rather than learning nationally or regionally prescribed content" (Maude, 2020, p.241).

A capabilities approach underpins the GeoCapabilities project. It stems from welfare economics and is informed by the theory of human development developed by Amartya Sen and Martha Nussbaum. It is a conceptual framework that explores what persons "are capable of doing, thinking or achieving and what freedoms this affords them to live life in the way that they choose" (Bustin, 2019, p.100). It perceives the central aim of education as the human development and flourishing through the

expansion of human capabilities (Bustin, 2019; Deng, 2020; Lambert, 2017b). 'Capabilities' denotes what persons can actually be and do, including "the different combinations of human functionings that can be achieved by people, groups, or both" (Lambert et al., 2015, p. 724). A capabilities approach "asks what an education can enable a young person to achieve far beyond any instrumental measure of success" (Bustin, 2019, p.110).

Lambert (2014) claims that "a 'capabilities approach' to curriculum thinking has the potential to help 'bring knowledge back in' (Young, 2008) and to develop a genuinely Future 3 curriculum future" (p.8). It "relies on teachers making decisions about what, why and how to teach with a shared understanding" of the relevance of subject powerful knowledge (Bustin, 2019, p.184). Such an approach "affords the possibility of working with specialist knowledge in a way that embraces broad educational goals, and in this way the capabilities approach helps teachers to operationalize Future 3 curriculum thinking" (Lambert, 2017a, p.142). Taught by teachers who are subject specialists, geography as a school subject enables students "to engage with powerful geographical knowledge, which develops GeoCapability and ultimately leads to geography pupils being able to think in new ways that were not possible before the development of this knowledge. This is an expression of F3 geography curriculum thinking" (Bustin, 2019, p.160).

The geographical knowledge that contributes to the development of capabilities is powerful disciplinary knowledge (e.g., Bustin, 2019; Lambert, 2017a, b; Lambert et al., 2015). It is an important component of the project's proposals for the teaching of geography (Lambert, 2017a; Lambert et al., 2015, 2016; Maude, 2018, 2020). Bustin (2019) claims that GeoCapabilities "articulates a means by which powerful knowledge can be embedded in a curriculum by ensuring a subject-based, knowledge-led curriculum" (p.183). This powerful knowledge contributes "to the education of all young people (or, put another way, how weak geographical knowledge acquisition in school contributes in a particular way to the deprivation of individuals' capabilities)" (Lambert et al., 2015, p.730). Deng (2020) contends that this disciplinary knowledge is "a means for a broader educational aim – the development of human capabilities – rather than as merely something to be taught for its own sake" (p.90). Bustin (2019) maintains that GeoCapabilities "is able to marry together the two major concepts of powerful knowledge and the capabilities approach" (p.126).

Lambert (2014) argues that “powerful knowledge in geography (as in any subject) cannot be itemised in a Hirschian list (although it may embrace the geography that appears on lists of things children ‘need to know’)” (p.9). He claims that powerful geographical knowledge includes “the acquisition and development of deep descriptive and explanatory world knowledge” (Lambert, 2017b, p.13), “the systematic conceptual knowledge of place, space and environment that makes up ‘relational understanding’” (Lambert, 2014, p.9), and “a propensity to apply the analysis of alternative social, economic and environmental futures to particular place contexts” (Lambert, 2017b, p.13). Lambert (2017a) contends that

> We teach geography, fairly obviously, to take children ‘beyond their experience’, for example:
> a. Literally – by teaching them about distant places, distributions and patterns they are unlikely to encounter in their everyday encounters;
> b. Conceptually – by introducing new ways of seeing and thinking (e.g., a ‘global sense of place’, ‘glaciation’, ‘development’, ‘settlement hierarchies’ . . .); and
> c. Affectively – by helping them to appreciate different perspectives and values (e.g., the lenses through which we make sense of the world; and how ‘others’ see ‘us’). (p.140)

Lambert (2018b) then discusses that powerful knowledge in school geography consists of the substantive knowledge (the ‘knowing that’), the procedural knowledge (how does it work), and the inferential knowledge (how the various aspects link together).

Roberts (2013, 2014, 2017) claims that “the key purposes of geographical education are to enable students to think geographically and to develop a critical understanding of the world” (Roberts, 2017, p.8). She discusses that geographical education is powerful if:

1. It values students’ everyday knowledge and enables them to make connections between this knowledge and school geography.

2. It enables them to perceive the world in different ways.

3. It enables students to be aware of the values dimension of decisions that affect local, national and world geography.

4. Students develop the skills needed to make sense of geographical knowledge.

5. Students take an active part in learning.

She claims that geographical education “is powerful if the transformative effects of geographical education on students’ thinking endure beyond school into adult life” (ibid., p.9). She maintains that this depends on a ‘powerful pedagogy’ characterised by “an inquisitive approach to learning and student involvement in purposeful activities, discussion and critical questioning” (ibid.).

5.1.2 History education

Chapman (2021a, c) discusses aspects of existing common ground in national and international thinking about disciplinary history education that might meet the epistemic criteria that powerful knowledge establishes. The question he addresses is: “How much do we know about the contours of a disciplinary history education that might meet the epistemic criteria that powerful knowledge sets up?” (Chapman, 2021a, p.10).

Chapman contends that the “starting point is the fact that students do not come to history class as *tabula rasa* but, rather, with a tissue of assumptions based in prior learning in school, and in prior life experience outside school” (p.10). Disciplinary history education seeks to move students from these “‘everyday’ ideas about historical knowledge and knowing” (ibid.), assisting them to replace these “weak and limiting ideas (often based on common sense)” by powerful disciplinary concepts (Chapman and Georgiou, 2021, p.76). Chapman (2021a) and Chapman and Georgiou (2021) contend that it is of vital importance that teachers consider and actively respond to their students’ “preconceptions and misconceptions about disciplinary knowledge, if they are to help move students beyond their experience and into understandings of specialised epistemologies” (Chapman, 2021a, p.20). Chapman and Georgiou (2021) maintain that “developing powerful historical learning and historical literacy necessarily entails and depends upon a focus on the pre/misconceptions and concepts that learners bring to their lessons” so that teachers can then accompany them into new learning which is “‘beyond their experience’ and help them develop new ways of modelling, experiencing and acting on the world” (p.73). These authors contend that the preconceptions and misconceptions that students bring with them “can hinder powerful knowledge development in history classrooms, unless they are carefully diagnosed and systematically addressed by teachers expert in disciplinary thinking and cognisant of the challenges that mastering it can pose for novices” (ibid., p.93).

Chapman (2021a) examines a number of models relating to conceptual aspects of historical knowing, models of disciplinary knowing. He discusses ontological and epistemic categories and the corresponding division between 'first-' and 'second-order' knowledge and understanding. First-order knowledge and understanding is world-knowledge about the past, such as the concept 'peasant' (e.g., Chapman and Georgiou, 2021). Second-order conceptual knowledge relates to history as a form of knowledge and a way of thinking, "how we make sense of our knowledge of the past" (ibid., p.76). Examples of second-order concepts are cause and consequence, change and continuity, evidence, interpretation, significance and similarity and difference (Chapman, 2021a; Chapman and Georgiou, 2021; Kitson, 2021). The idea underlying this first-/second-order distinction is that learning history

> involves mastering a large body of information but also, crucially, learning how to process and make sense of this information by learning how to construct and evaluate knowledge claims (evidential reasoning), how to construct historical explanations (causal, empathetic and intentional explanation), how to evaluate historical significance, and so on. (Chapman and Georgiou, 2021, p.94)

It is the argument of Chapman (2021a) and Chapman and Georgiou (2021) that for students to have a solid grasp of history, they need to progress in both the first and the second-order dimensions of domain knowledge and understanding. These authors emphasise the second-order dimension because they claim that it is critical in enabling students to make sense of what is learned.

Drawing on Maude (2016) who has discussed the typology of the types of knowledge that school geography can develop, Kitson (2021) explores what an 'enabling' view of the power of school history might look like. She identifies three types of dispositions that powerful knowledge in school history might help students develop and which can guide content selection processes. These are being able to discover new ways of seeing the world today, engaging in society's conversations and debates about itself, and understanding the grounds for accepting or rejecting knowledge claims. In each case she provides examples to illustrate how history education offers specific contributions to these dispositions – the kinds of 'power' historical knowledge and historical thinking can offer students today. She emphasises that "if we wish to think seriously about the power of historical knowledge to enable young people to think in different ways about the present, for example, this has quite profound implications for

both what we teach and how we help young people to understand and organise this knowledge" (p.44).

Kitson (2021) maintains that to achieve a Future 3 curriculum, students need to learn enough substantive knowledge that takes them beyond their everyday experiences. This knowledge is "part of a wider disciplinary knowledge that makes the process of knowledge creation in history visible" (p.38). She contends that the "key to realising a Future 3 vision in history classrooms consists of "an appropriate balance between … propositional (know-that) knowledge and procedural (know-how) knowledge" (p.39). She also argues in favour of the "need for more 'big picture history' in the form of broad frameworks" (p.45) developed in the context of a school curriculum that assist students to orientate themselves in time, enabling them "to draw on the past to inform the present and future and to gain a sense of perspective about their lives today" (p.44).

Kitson (2021) also draws on geography education (Roberts, 2014, 2017) to develop an argument about the pedagogic implications of implementing powerful knowledge curriculum principles in schools. She concurs with this author about the need for

> a more nuanced understanding of the relationship between curriculum and pedagogy which acknowledges history teachers' roles as curriculum makers and which takes seriously the importance of a 'powerful pedagogy' which is best suited to realising history's potential as powerful knowledge in schools (Kitson, 2021, p.48).

She argues that the use of enquiry methods enables students to make connections between the disciplinary contents and disciplinary concepts and help them engage with propositional and procedural knowledge. She claims that enquiry approaches help students construct usable frameworks of knowledge through their history education.

5.1.3 Physics education

Yates and Millar (2016) draw on their research project that has interviewed university physicists and school physics teachers in Australia about how they understand the field of physics and what is needed or valuable in the curriculum. The participants perceived the value of their subject and the powerful knowledge it provided, although this was not explicitly spelled out. What they valued most, however, was the infusion of social values and skills related to the subject. The authors noted that "both physicists and physics teachers conveyed their own sense that what is powerful is related to

conveying in some way the discipline, not simply bits of useful knowledge or techniques produced by that discipline" (p.309).

The participants kept in mind that most students found it difficult to grasp the mathematics involved in contemporary physics and that most probably they will not opt to study the subject after finishing their secondary school studies. As such they provided their students with "an initial experience of approaching the world as a physicist" (p.307). This included a basic understanding of how motors work, following scientific debates in society, being familiar with the history of the field and its achievements, and "a (motivating) sense of the big field and problems physics is involved in today" (ibid.). These teachers wanted their students to learn the basic ways of how to act like physicists or grasp the basic formulae, foundational knowledge and theories of physics. However, they also "wanted students to learn to appreciate, or respect, or even better, became passionate about science and this way of doing things, in part through seeing and respecting what physics today has to offer" (ibid.).

5.1.4 Mathematics education

Hudson (2018), Hudson et al. (2015) and Golding (2022) analyse the epistemic quality offered by school mathematics education: "What is it, why does it matter, and what might it look like in a classroom?" (Golding, 2022, p.137). This notion of epistemic quality informs my Future 3 conceptualisation of economics.

Curriculum theorists and teachers need to develop curriculum principles that maximise the chances that all students have epistemic access (Hudson, 2018; Hudson et al., 2015). This is access to the 'best' knowledge available in any field of study they engage in (Young, 2008, 2013a, 2014a, 2018), being the "better knowledge, more reliable knowledge, knowledge nearer the truth" (Young, 2013a, p.107). Hudson (2018) takes this notion of powerful knowledge as a starting point and considers it as a question of high epistemic quality in a Future 3 mathematics curriculum. This "involves an approach that presents mathematics as fallible, refutable and uncertain, and which promotes critical thinking, creative reasoning, the generation of multiple solutions and of learning from errors and mistakes" (ibid., p.388). In contrast, school mathematics of low epistemic quality "presents the subject as infallible, authoritarian, dogmatic, absolutist, irrefutable and certain, and also involves rules that follow strict procedures and right or wrong answers" (ibid., p.389). This is a "mutated form of

mathematical fundamentalism" made up of degraded and low epistemic quality where students do not experience the sense of enjoyment and fulfilment of learning the subject (ibid.).

Golding (2022) discusses the mathematical epistemic quality evidenced in the classrooms her team researched. This is the quality of the syntactical and substantive mathematics offered to students, and to the quality of epistemology. The latter is "the theory of the disciplinary knowledge, especially with regard to its methods, validity and scope, and the approaches to establishing new knowledge as justified belief" (ibid., p.138). She contends that the quality of epistemic access depends on the teacher's knowledge, skills, beliefs and commitment, and curriculum interpretation. While Hudson (2018) exemplifies high and low epistemic quality in school mathematics with descriptions of widely contrasting transformations of the intended curriculum, the findings of Golding (2022) similarly suggest a range of quality between these two extremes.

Golding (2022) claims that high epistemic quality includes access to knowledge that is discovered or created by the individual engaging with it, satisfying one goal of the school curriculum in supporting the move from disciplinary novice towards expert (Stobart, 2014). This knowledge includes utilitarian knowledge for everyday purposes, knowledge of a range of substantive mathematical content and processes, socially and economically empowering knowledge that enables appreciation of the world, creative know-how, and the epistemology of school mathematics as a discipline closely related to the parent discipline. Knowledge of high epistemic quality enables epistemological ascent, "without which learners cannot fully participate in, or appreciate, the powerful culture of the discipline" (Golding, 2022, p.149). This develops over time in a manner that "students' ways of mathematical working and being are increasingly aligned with those of mathematics practitioners in different fields" (ibid., p.150). The author discusses learning experiences that provided access to 'high-quality mathematical epistemology'. These involved an element of surprise or of frustration which was supported by teachers, who "drew on highly skilled teaching, deeply knowledgeable not only about the mathematics and the epistemology but about the students and their learning of mathematics at that point in time" (ibid., p.151).

5.1.5 Developing a framework for economics

A common thread running through the literature discussed above is the examination of the characteristics of powerful knowledge in the subject concerned and what this knowledge may enable the students to do. This provides insights for a way forward for the exploration and the identification of powerful knowledge in school economics.

The literature emphasises what powerful knowledge in a school subject can empower those who possess it: the intellectual powers that such knowledge may provide students with (e.g., Chapman, 2021; Chapman and Georgiou, 2021; GeoCapabilities; Kitson, 2021; Maude 2016, 2018, 2020; Roberts, 2013, 2014, 2017). These authors concur that the key purposes of educating in the school subject are to enable the students to think in the subject (e.g., historical thinking) and to develop a critical understanding of the world. The GeoCapabilities project, for example, argues in favour of the acquisition of knowledge that contributes to the education of all students by enhancing their capabilities. This knowledge seeks to assist the students to mature from their everyday ideas about the knowledge in a subject into acquiring powerful disciplinary concepts. By way of contrast, although Yates and Millar (2016) report that teachers valued powerful knowledge in physics education, their emphasis was that young people became passionate about the subject and perceived and respected what physics has to offer.

The notion of epistemic quality from mathematics education provides insights to developing powerful knowledge in economics which is dominated by the neoclassical orthodoxy. Like powerful knowledge, it suggests an approach that provides the students access to knowledge that is discovered, created and engaged with. This approach presents economics as fallible and refutable, and promotes the engagement with the knowledge that is presented by the curriculum through critical interrogation, creative reasoning and the generation of solutions and ideas of how things can be different.

The arguments relating to powerful knowledge in this literature review are situated within the particular discipline concerned. For example, within the context of history education, Kitson (2021) argues for the need for a more ‘big picture history’ in the form of broad frameworks that assist the students to orientate themselves in time. An analysis of powerful knowledge in economics needs to be situated within the context

of economics as a discipline dominated by the neoclassical school of economic thought and underpinned by a positivistic framework.

5.2 Powerful knowledge in secondary school economics

Powerful knowledge is knowledge which is different from the everyday knowledge and personal experience students bring to school: it is specialised, has rules and boundaries, and is oriented to more conceptual and generic forms of knowing (e.g. Deng, 2018, 2020; Young, 2008, 2018, 2021). Students would start to think in new ways, applying economics knowledge to new and unfamiliar contexts beyond their experience.

Following an approach similar to Lambert (2014, 2017b), Maude (2016, 2018, 2020), Roberts (2013, 2017) and Kitson (2021), I argue that there are two ways of perceiving powerful knowledge in school economics. The first type of powerful knowledge is discipline based, theoretical, part of a system of thought, dynamic, evolving but reliable, testable and open to challenge, sometimes counter-intuitive, and existing outside the direct experience of the student. This is discussed in section 5.2.1. The second type of powerful knowledge derives from this first type of powerful knowledge and gives students the intellectual ability to analyse, explain, predict, evaluate and think about the world in ways that are beyond their personal experience (section 5.2.2).

5.2.1 Discipline based knowledge

What economics content is likely to be most powerful? What are the economic concepts that meet the epistemic criteria that powerful knowledge establishes? This is not an easy task (e.g., Kitson, 2021; Yates and Millar, 2016). For instance, Yates and Millar (2016) argue that there is no consensus in physics about what content should be included and what should be excluded and the sequencing and pacing of a body of commonly agreed content. Kitson (2021) maintains that “disciplinary boundaries will inevitably constrain content choices but do not precisely define them: there is too much we could teach” (p.40).

I draw upon the economics threshold concepts that are proposed by the literature (discussed in section 3.9), concurring with Modig (2021) that threshold concepts are an “important resource to be considered when deciding on what economic content students should have access to in school enabling them to face economic issues in their private and public lives” (p.2200). Being developed by economic experts within

an epistemic community they constitute powerful economic knowledge from a disciplinary perspective (Modig, 2021). Disciplinary knowledge derived from these communities is a relevant source for identifying important economic knowledge (Young, 2008, 2013a, 2014e, 2021). It is specialised knowledge that enables students to think and discuss issues in a new and more well-informed way (Modig, 2021). By transforming the students' perspective of the economic world around them (e.g. Ashwin, 2015; Meyer and Land, 2003; Davies and Mangan, 2007; Modig, 2021; Shanahan, 2016), economics threshold concepts meet the criteria established by powerful knowledge by enabling students access to critical ways of thinking about the economic world which transform their perceptions, values, priorities and behaviour.

When students grasp economics threshold concepts, they proceed to reconfigure ways of classifying economic phenomena and ways of understanding relationships between the respective phenomena. These conceptual aspects of economics knowing become embedded in their thinking, providing access to disciplinary knowledge and understanding in economics that is beyond their everyday experience. A group of threshold concepts may eventually combine to characterise a way of thinking in a discipline (e.g., Davies, 2018). This author argues that economic understanding develops as successive threshold concepts are integrated into a scientific framework. The development of understanding of the discipline is seen in terms of "an expanding frame of reference as further threshold concepts are incorporated in a structure of thinking" (ibid., p.8).

Section 3.9 of this thesis has discussed the economics threshold concepts identified by the literature. These are opportunity cost, price formation through interaction between markets (including elasticity), marginality and general equilibrium. Opportunity cost is the most emphasised concept (e.g., Davies, 2018; Davies and Mangan, 2006, 2007, 2008, 2010; Meyer and Land, 2003; Modig, 2021; Shanahan, 2016; Shanahan et al., 2006, 2008). It is the foundation of a web of interconnected concepts (Davies and Mangan, 2007), such as the production possibility curve (PPC), consumer choice, demand schedules, the decision to supply, perfect competition, efficiency, comparative advantage, incentives, price signals, and markets generally (e.g., Shanahan, 2016). These interconnected concepts include supporting personal concepts which are economically oriented perspectives on everyday life, and procedural concepts consisting of ways of practising or articulating economics.

Students may get stuck in their understanding of a threshold concept if these supporting concepts are not sufficiently grasped (Davies and Mangan, 2006, 2007; Shanahan et al., 2006; Shanahan, 2016).

5.2.2 Expressions of powerful economics knowledge

Young defines powerful knowledge as that knowledge that provides students with the intellectual ability to analyse, explain, predict, evaluate and think about the world in ways that are beyond their personal experience (e.g., Young, 2013a, 2014b, 2021). This section focuses on aspects of economics knowledge which are derived directly from this definition, describing the types of economics knowledge that might be considered powerful. It explores an 'enabling' view of what the power of school economics might look like.

By arguing for an alternative conceptualisation in the teaching and learning of economics other than a neoclassical one underpinned by positivist theory (chapter two), this thesis highlights the need of economics knowledge and pedagogy that empower students to grow aware of the grips of mainstream economics, perceive models as explanatory devices, explore reality, adopt a pluralist approach, develop criticality of thought in framing economic problems, mature in financial and economic literacy, and consider the moral dimension of economics (section 2.4). In this manner, the discipline, perceived as a social science underpinned by a critical realist conceptualisation, empowers students to move beyond their everyday knowledge and experiences and provide new ways of looking at the world. Such disciplinary knowledge becomes a resource for the development of students' intellectual and moral powers or capacities (Deng, 2018, 2020). I concur with Modig (2021) "that acquiring in-depth economic knowledge provides people with powerful economic knowledge, enabling them to better act in, understand, discuss and question the prevailing system" (p.2204).

By drawing upon the literature review relating to economics education (chapter two), I conceive the following expressions of powerful economics knowledge.

Expression 1: Knowledge that provides students with a deeper understanding of the economic world around them

Economics knowledge is powerful when it enables students to better understand and explain phenomena or events happening in the economic world, particularly those that

are beyond their personal experience (e.g., Young, 2013a, 2018, 2021). It is powerful when it provides an explanatory function to help young people understand better important economic issues (Brant, 2011, 2015; Brant and Panjwani, 2015; Spotton Visano, 2019). It provides them with a distinctive way of perceiving the world through an economic lens, enabling them to make informed choices as consumers, citizens and workers (e.g. Brant, 2011, 2015; Davies and Brant, 2006; Grant, 2006; Jephcote, 2005; Jephcote and Abbott, 2005b; Krueger, 2019; Skidelsky, 2020).

Economic models are a useful tool in helping students to critically explore, understand and explain reality better. These models need to be perceived as providing an explanatory function and not as truth in themselves (section 2.4.3). By first exploring reality through discussions contextualised with relevant examples from the real world and the teachers' and students' life (section 2.4.4), students critically engage with these models which they perceive as assisting the identification and understanding of the structures, powers, mechanisms and tendencies which produce or facilitate economic phenomena (Brant, 2011, 2015; Skidelsky, 2020). The threshold concept of price formation through interaction between markets, for example, helps students understand better the forces of demand and supply which influence prices and the decisions of firms. Krueger (2019) illustrates how this model sheds light upon the various pricing decisions regarding concert tickets. Another example is when teachers teach the law of demand. They tend to present the demand curve as if it is an entity in itself (Figure 7), formulating that when price rises demand falls and vice versa. It might be presented in such a way that students have to accept this 'law' uncritically; this is akin to a Future 1 curriculum. Another approach is for teachers to bring an object in class, such as a chocolate bar, and ask their students how much they are willing and able to buy at each price, gradually constructing together the demand curve from real data. Teachers can then organise their students in groups and provide guiding questions with the aim of eliciting the forces and tendencies that underpin the demand curve. Students can be invited to consider, for example, "Why do I still buy an ice cream on a hot day even though the price is high, thus contradicting the law of demand?" and "What is the nature of the commodity?" The aim of the discussion is to clarify that the model is not truth in itself but a useful tool that assists the understanding of the mechanisms and forces that underpin demand in the different markets around us.

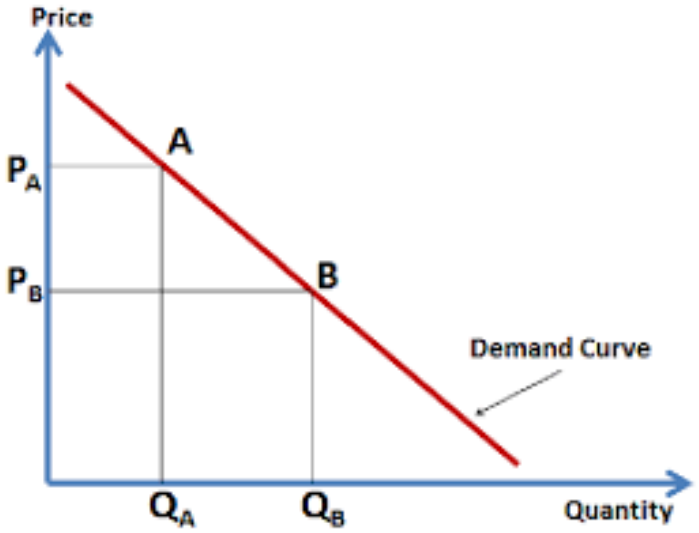

Figure 7. Demand Curve

Expression 2: Knowledge that equips students with new ways of thinking about the economic world

Based on the discipline's major concepts and their application, economics knowledge empowers students to think in new ways about the economic events and phenomena happening around them. Such knowledge provides students with critical ways to analyse, explain and understand economic situations. Section 2.3.2 has discussed how the adoption of a critical realist philosophy assists into perceiving the discipline as a social science which nourishes new insights for thinking about economics (Brant, 2011, 2015; Brant and Panjwani, 2015; Vincent and O'Mahoney, 2018). It provides, for instance, an explanatory function to help students understand better and improve the world in which we live.

Teachers who embrace a Future 3 curriculum would assist their students to explore the powers, generative mechanisms and tendencies that contribute to the production of some identified economic phenomenon of interest. Students would be helped to proceed from the knowledge of a phenomenon existing at any one level of reality to a knowledge of mechanisms at a deeper level of reality, which contributed to the generation of the original phenomenon of interest (Bhaskar, 1979, 2017). They would be accompanied to move "from a 'surface phenomenon' to some 'deeper' causal thing" (Lawson, 1997, p.23). This is 'powerful' because students would move from a level of reality that they understand to the level of what explains them, which at any moment of time they might not have been understanding them (Alderson, 2021; Bhaskar,

2017). They would then be able to propose sound explanations (Brant, 2011). I illustrate by referring to the 'price' of a commodity. This is "generated by processes that we do not directly experience but which we can model or imagine through our reasoning" (Davies and Brant, 2006, p.114). The secondary school economics syllabus refers to 'supply curve', 'demand curve' and 'equilibrium'. However, buyers and sellers do not directly experience these. In a Future 3 economics classroom, students would be accompanied by their teachers to think critically about the processes and generative mechanisms underlying these ideas. Students would understand that "the actual reality that gives rise to these processes lies a step further removed from our experience, essentially unreachable, but that does not mean that we are not influenced by its nature" (ibid.). They would interact with the economics knowledge proposed by the syllabus, understanding better the social structures, powers, mechanisms and tendencies that are responsible for the actual course of economic events and states of affairs. This Future 3 scenario would consolidate economics' position as "an explanatory social science that attempts to address highly complex financial and social issues that face the world in which we live" (Brant, 2015, p.10).

Orthodox economists perceive individuals from an egocentric point of view and abstract from social relations (Brant, 2011, 2015; Chang, 2014). In a Future 3 economics curriculum, students would be empowered to perceive persons conducting their economic behaviour whilst socially interacting with others and caring for them. For example, they would start perceiving homo economicus conducting his/her economic choices whilst embracing and fostering values, and being compassionate towards other human beings. As an example, orthodox economists contend that a producer should reduce the amount of workers employed when the marginal cost (MC) is greater than the marginal revenue product (MRP) because the profit-maximising point has been achieved. Teachers would help their students to be aware and challenge this idea of perceiving workers as resources that could be disposed of, and would cultivate an attitude towards valuing the firm's labour force by providing good working conditions and long term job security.

By enacting a Future 3 curriculum, teachers would cultivate a learning environment where their students learn to develop their thinking how to criticise the conception of homo economicus which underpins the models of mainstream economics. They would

be enabled to challenge the idea of this "human calculating machine" who is "continually calculating how to get the most ('maximum') gain he can for the least cost" (Skidelsky, 2020, p.8), and is regarded to respond to economic interventions in a predictable way. Teachers would help their students to challenge the notion of homo economicus as the passive receptor of events, and to start perceiving him/her as a person who can exercise real choice and imagination (e.g., Chang, 2011, 2014; Lawson, 1997) and who therefore does not fit into static economic models. So, for instance, referring to the example in the previous paragraph, students would be enabled to discuss stories of employers who during the Covid-19 pandemic decided not to dismiss workers although their sales revenue had fallen drastically. Young people would thus be accompanied to conceive the moral dimension infused into economics, in this case, employers who care for their labour force and do not follow the suggestion of the economic model to dismiss workers.

Another form of knowledge that the proposed alternative conceptualisation for economics provides in a Future 3 curriculum is that students would learn to contextualise economics socially, historically and politically. They would realise that "economics doesn't exists in isolation from society, but is embedded in the social system and relates to many spheres. Decisions made by individuals, firms and governments will affect other individuals, society and the environment" (Brant, 2015, p.13). By perceiving economics in its context as a social science, they could then criticise the tendency of mainstream economics to "model the world as a giant computer network in which every possible move has been progammed, and anything outside the frame excluded by assumption" (Skidelsky, 2020, pp.3-4). Students could start to consider "new ways of economic thinking that better incorporate humanitarian and ecological values into the economic system" (Modig, 2021, p.2201). This would be bringing back into economics its moral dimension (Brant, 2015; Brant and Panjwani, 2015; Chang, 2014; Ransom and Baird, 2009; Sober-Giecek, 2000), discussed in section 2.4.8. Students could start to think in new ways when evaluating an economic argument by considering which moral values and political goals are involved, the role of power in shaping economic relations, real-world structures, social decline, and the effects of widespread wars, the Covid-19 pandemic, famines and other miseries. They could also challenge the status quo thinking that the discipline is value-free (Aldred, 2009, 2019; Brant, 2011; Chang, 2014; Fine, 2010); their

arguments could give due consideration to values such as love, justice in the distribution of wealth and income, courage, honour, loyalty, and public service (e.g., Chang, 2014; Ransom and Baird, 2009; Sober-Giecek, 2000). Consequently, their reasoning of economic issues would not require them "to squeeze their explanations of human behaviour into absurdly narrow channels" as mainstream economists are accused of doing (Skidelsky, 2020, p.9).

Expression 3: Knowledge that enhances students' criticality of thought in economic issues and their participation in economic debates

Powerful knowledge "allows those with access to it to question it and the authority on which it is based and gain the sense of freedom and excitement that it can offer" (Young, 2014b, p.20). It enables students to evaluate claims about knowledge itself, giving them the opportunity to be independent thinkers who can be critical of the opinions of others including those of people in authority positions.

Young people grow aware of the state of affairs of economics and economics education dominated by the neoclassical economics orthodoxy (section 2.1), and that this ideological preference for neoclassical theory also permeates their secondary school economics curriculum (section 2.2). Students start recognising the grips of this dominant school of economic thought. They are not trapped by it, but are empowered to criticise this outdated paradigm where the status quo is accepted (e.g., Lawson, 1997; Piketty, 2014), trying to "persuade you to see the world" as it does (Skidelsky, 2020, p.xi), and theories are taken and presented as facts (e.g., Brant, 2011, 2015; Lawson, 1997; Skidelsky, 2020), without answering "the far more complex questions posed by the world we live in" (Piketty, 2014, p.41).

Students critically consider different economic approaches and schools of thought, and participate in discussions over a range of perspectives on the economy. I concur with Brant and Panjwani (2015) that when students consider "alternative conceptualisations of the workings of the economy" they mature in their "ability to adequately understand the world in which they live and their capacity to contemplate alternatives" (p.307). By considering an overview of the history of economic thought, students broaden their awareness that there are approaches to economics other than the dominant neoclassical approach of a market economy dominated by neoclassical models. Skidelsky (2020) maintains that it is important that students are exposed to

the historical background of economics because it illustrates how “economic doctrines, far from being the universal truths they claim to be, are connected to particular historical conditions and episodes” (p.13).

During their economics course, young people grow familiar with the ways economics knowledge is constructed, tested and evaluated. Keeping in mind that the positivist conception of science is uncritically accepted in much of mainstream economics, they are able to criticise the economics content proposed to them. They are enabled, for example, to discuss the unrealistic attempt of mainstream economics to construct a set of universal laws applicable to all economic situations and problems (section 2.1.4). They realise that orthodox economics, being unable to validate its most important hypotheses empirically, tends to slide into ideology (Lawson, 1997; Piketty, 2014; Skidelsky, 2020), facing the temptation of continuing “to churn out purely theoretical results without even knowing what facts needed to be explained” (Piketty, 2014, p.40). Students are able to criticise such out-dated theory and static neoclassical economic models falling in the category of ‘zombieconomics’ (section 2.4.4).

Young people become active participants in their own learning, gradually maturing into critiquing and debating existing theories, gaining insights, and forming their own views about how the economy works (Brant, 2015; Brant and Panjwani, 2015; Chang, 2011, 2014; Dow, 2009; Jephcote, 2004; Spotton Visano, 2018, 2019). A pluralist approach towards the discipline and the enhancing of their criticality of thought broaden their economics perspectives (sections 2.4.5 and 2.4.6), gradually dislodging the dominance of mainstream economics. I discuss an example relating to the production possibility curve (PPC). This model illustrates the concepts of scarcity and the opportunity costs of choices when faced with the possibility of producing two commodities (Figure 8). Points inside the curve are inefficient, points on the PPC are efficient, and points outside are unattainable. Moving from one efficient combination of production (e.g. point B) to another efficient combination of production on the PPC (e.g. point D) entails an opportunity cost. This is how much of one commodity is given up in order to get more of the other. Teachers adhering to a Future 1 curriculum lead their students to accept this static neoclassical theory, conceiving the PPC as an entity in itself. Within this learning environment, teachers and students accept economic models and “‘laws’ uncritically, influenced by the ‘certainty’ in which they are presented” (Brant, 2015, p.14). In a Future 3 curriculum, students would critically

engage with this model, being enabled to criticise its assumptions, such as that of assuming a 'world' of two goods (butter and guns) without a time dimension, which render the model as unrealistic and abstracted from the real world. Teachers would educate their students to perceive this model underpinned by the threshold concept of opportunity cost as a tool that explains the unseen forces and mechanisms at work.

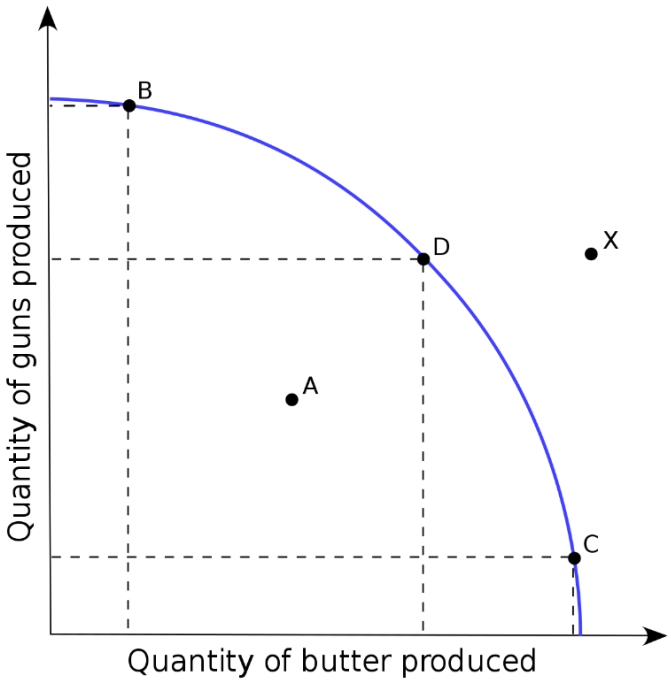

Figure 8. The production possibility curve

Students would be empowered "how to think, rather than what to think" (Chang, 2014, p.6). Economics education would educate them "in judgement" (Dow, 2009, p.48) and in choosing "their own approach and address alternatives as they become practising economists" (ibid., p.54), becoming "good critics of economic policy" (Sober-Giecek, 2000, p.v). They would seek to find out what is really going on, critically judging issues and statistics whilst understanding the basis for their own judgements. They would be empowered to evaluate the decisions of their policy-makers and encouraged to voice their opinion (Chang, 2011, 2014). Chang (2014), for instance, highlights the need of educating young people not to "accept statistics unthinkingly" (p.455). Students would acquire the freedom "that results from the possibility to detect faulty arguments or propaganda – and the freedom to discern and value 'better' knowledge" (Lambert, 2017a, p.141). I concur with Lambert (2017a) that these are "effects or outcomes that can be described as powerful" (Maude, 2016, p.71).

The aspects of powerful knowledge in secondary school economics education discussed in this section 5.2 are summarised in Figure 9 below. It blends together substantive knowledge and aspects of economics thinking to generate powerful disciplinary knowledge in economics.

Figure 9. Powerful knowledge in secondary school economics

5.3 A Future 3 economics curriculum

This is a powerful knowledge curriculum which would assist young people to develop and engage with powerful economics knowledge. This knowledge is disciplinary knowledge where understanding of the substantive knowledge is integrated with an understanding of its methodology and epistemology (e.g., Deng, 2020; Kitson, 2021; Lambert et al, 2015). Teachers would need to pay attention to both the substantive economics knowledge and the procedures and processes involved in its creation. It is important to stress that students require enough substantive knowledge to make this process possible (e.g., Kitson, 2021). This arises from the need of learning the substantive knowledge as part of a wider disciplinary knowledge that makes the process of knowledge creation in economics visible and from the relevance of knowledge that is powerful in providing ways of thinking about the world for all students. Deng (2020) contends that the knowledge selected needs to include both the "substantive (the 'what')" and the "'disciplinarity' (the 'how') - how knowledge is

developed by researchers in academic, disciplinary communities" (p.88). The key to realising a Future 3 vision in economics classrooms is a careful balance between propositional (know-that) knowledge and procedural (know-how) knowledge (e.g., Kitson, 2021), between aspects of economics thinking and a strong underpinning of substantive knowledge. This is "the balancing act that teachers juggle every day and is a critical one for the realisation of a Future 3 curriculum" (ibid., p.39).

In contrast, disciplinary knowledge in a Future 2 economics curriculum is not given its due importance. The emphasis upon attainment in examinations leads to "creeping genericism where schools seek 'one size fits all' solutions to complex issues such as assessment, differentiation, lesson planning and progression" (Kitson, 2021, p.35), leading to generic approaches to teaching particular disciplines, such as in the form of the Bloom's taxonomy which some schools tend to use across subjects. This taxonomy assumes that there is a body of knowledge and a collection of generic thinking skills which are equally applicable in the various disciplines. For instance, students are 'trained' to use the assessment language proposed by this model rather than grasping the economics substantive and disciplinary knowledge. This learning environment does not nourish powerful knowledge and "is a far cry from the disciplinary knowledge of a Future 3 perspective" (ibid.). Adopting this trend in economics takes us into a Future 2 scenario. This curriculum focuses "too heavily on specific competences and generic skills such as critical thinking or creativity" which "may in effect impede young people from developing and practising powerful disciplinary knowledge" (Lambert, 2017a, p.141). Thinking in the discipline of economics is not generic. Claiming that it is generic reduces economics knowledge to information rather than as a discipline rooted in powerful economics knowledge arising from an epistemic community.

In a Future 3 economics curriculum, a pluralist pedagogical approach would invite the cultivation of a conscious awareness of and reflection on whose knowledge teachers and students are analysing, developing a critical consciousness about the economics knowledge itself – about what is talked about, how it is talked about and who gets to decide (Brant, 2015; Brant and Panjwani, 2015; Spotton Visano, 2018, 2019). Students could be encouraged to consider why economics knowledge gets moulded the way it does and how a particular school of economic thought gained a privileged status. In a Future 3 curriculum, teachers might encourage students to challenge the

ubiquity of the market and become critical of its workings (e.g., Brant, 2015). In this respect I discuss an example of how the teaching and learning of 'price' can be approached. From my own professional experience as a teacher educator, I witness a tendency for teachers to adopt a Future 1 approach where they present theories as facts and "learning is often passive due to a (false) acceptance that knowledge is a static collection of facts to impart on learners" (Brant, 2015, p.13). They tend to explain the theory, present the demand and supply model, and discuss real-world examples to try to validate or exemplify the theory. When teaching this price formation through interaction between demand and supply, teachers present a graphical respresentation that may look as follows:

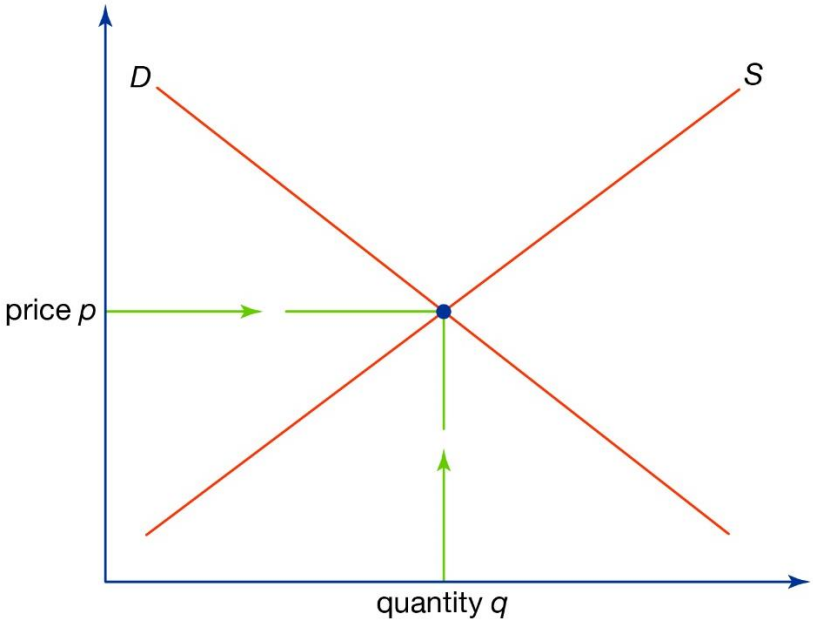

Figure 10. Demand and supply diagram

The syllabus content specified is the determination of price by the interaction of the demand and supply curves, with the equilibrium price being at the point where the two curves intersect. In this case no reference is made to a product that features in the students' life. This graph "implies a degree of certainty and it would not be unreasonable for a learner to assume that a supply curve 'exists' and that likewise a demand curve is 'real'" (ibid.). Students are not led into a discussion about the forces underlying the demand and supply, about the nature of the product, and when and where the exchange happens. This Future 1 approach "is deficient in that it presents certainty where certainty does not exist and that it is likely to lead to misunderstandings and misconceptions in the learners that may be hard to correct" (ibid.).

In a Future 3 economics curriculum, teachers would facilitate their students' interaction with this economics knowledge to be taught, such as by adopting a 'back-to-front' approach (ibid.) which first explores reality and then uses economic theory as an explanatory tool. This is in contrast to a Future 1 transmission pedagogy. Brant (2015) discusses how students can be provided with a scenario where a half-litre bottle of branded water is priced at €1 in a supermarket, €1.25 in a convenience store, €2 in a restaurant and €5 in an exclusive club. Students are assigned into groups to explore explanations for the price differences. The aim is to provide them with the opportunity to articulate their reasoning aloud and for the teacher to address misconceptions. A whole-class discussion follows with the aim of consolidating learning and critically exploring the forces and mechanisms at work that influence price, price differentials of the same product and changes in the prices of other commodities. A supply and demand diagram follows. This is not taught as if it were a canon of knowledge or a real entity in itself but as an explanatory device that assists the understanding of the forces affecting price determination.

A powerful knowledge economics curriculum would concentrate on cultivating young people's agency by developing their grasp of 'the powers of knowledge' (Young, 2021). Teachers and students would engage with a knowledge-led economics curriculum where knowledge is not static but dynamic, contested and changing (Mitchell and Lambert, 2015). This Future 3 economics curriculum of engagement would be characterised by "engagement with the subject's ideas - and therefore heavily reliant on specialist teachers taking responsibility to find ways to engage all young people, in some intellectually defensible manner, with those ideas" (Lambert, 2019, p.173). Teachers would think hard how to engage their young learners "with complexity, with theoretical knowledge, with knowledge that appears counterintuitive or at least contradicts the common sense and the everyday" (Lambert and Biddulph, 2015, p.221). This contrasts, for example, with a Future 1 curriculum of compliance, where knowledge is given, uncontested or predetermined, such as when students are just presented with static neoclassical economic models as facts with no possibility to interact with these ideas. Whilst involving the social and cultural capital and values that students bring to their lessons, teachers could engage them with knowledge that once grasped, enriches them with powerful economics knowledge. Such a Future 3 curriculum in the secondary school economics classroom would provide the

conceptual knowledge that emphasises the cultivation of student understanding based on the discipline's major concepts and their application.

5.4 Powerful pedagogy and curriculum making

A Future 3 economics curriculum would provide teachers and students with a way of thinking through the economics syllabus. Teachers could use their expertise to interpret and develop this syllabus and the appropriate pedagogy to become "a source of strategies and expertise" for their students (Young and Muller, 2010, p.16). In this classroom environment, they would employ their professional knowledge, knowledge bases for teaching and PCK to facilitate their students' encounter with economics knowledge. This is a Future 3 curriculum of engagement where teachers and students would interact with the substantive economics knowledge involved, generating deep learning and progression in the students' journey of thinking in the subject.

In a Future 3 economics curriculum, teachers would take responsibility for enacting the curriculum. Such a curriculum "is impossible without teacher practitioners who are ready and able to take responsibility for curriculum *enactment*, a form of curriculum leadership … known as 'curriculum making'" (Lambert, 2017a, pp.132-133). In a Future 3 economics curriculum teachers become curriculum makers (Lambert and Biddulph, 2015; Lambert, 2017a), "who interpret and enact the national curriculum (e.g., standards and curriculum guidelines) to bring about the 'engagement with powerful knowledge' – rather than merely to transmit knowledge" (Deng, 2020, p.89). They become involved in those processes where "curriculum making is in effect curriculum thinking in practical action taking on a trinity of educational practice" of subject, student and teacher (Lambert and Biddulph, 2015, p.217). This would occur at the classroom level where curriculum and pedagogy merge. An important aspect of "teachers' professionalism is their identity as specialist knowledge workers, working to develop powerful disciplinary knowledge in what they teach" (Lambert, 2017a, p.142). This would happen through a 'curriculum of engagement' and not just by delivering the content.

A curriculum that aims to make economics learning powerful for their students requires expert teachers who carefully plan and accompany their students' progression in their knowledge and understanding (e.g., Kitson, 2021; Lambert, 2017a; Puustinen and Khawaja, 2021; Stobart, 2014). Teachers in a Future 3 economics classroom need to

be “cognisant of the conceptual knowledge structures of specialised knowledge domains, of the current state of knowledge in the disciplines that study those domains and of the history of those domains’ development, including their current trajectories” (Chapman, 2021a, p.8). Enabling progression across these aspects of learning in a Future 3 economics curriculum rich in substantive and disciplinary knowledge requires teachers to drawn on their professional knowledge bases and PCK, understanding and skill to generate a pedagogy which is necessary for the realisation of powerful knowledge in the classroom.

To realise powerful knowledge, teachers as curriculum makers would need to “blend curricular and pedagogic decisions not just at the level of a scheme of work or a yearly programme but at the level of the individual lesson, too” (Kitson, 2021, p.48). Pedagogy “should not be an afterthought to curriculum discussions but instead seen as a critical way of realising powerful knowledge in the classroom” (p.47). Since knowledge “is only potentially powerful”, teachers need to adopt “the pedagogies that would make such knowledge accessible and meaningful for all students” (Roberts, 2014, p.205). The syllabus specification may remain “inert, useless and inaccessible to the student without the creative contribution of a teacher” (Lambert 2017b, p.15). By grasping “why her subject matters, which is to say wherein lies the powerful knowledge”, teachers need to be “in a position to make the curriculum ‘speak’ … No-one else can do this” (ibid). They are the “subject specialists who can provide the awe and wonder of a subject, and only they who can induct young people into a ‘discipline’” (Bustin, 2019, p.186). It is by using appropriate pedagogic strategies that a curriculum based on powerful knowledge could be enacted (e.g., Bustin, 2019; Puustinen and Khawaja, 2021; Roberts, 2014, 2017; Lambert, 2017a, b).

It is this teachers’ pedagogy (also discussed in section 2.4) that would introduce students to the economics knowledge that cannot be gained from everyday experiences. Deng (2020) contends that teachers, besides requiring a grasp of the substantive knowledge of the discipline and of its disciplinary root, need also “to have knowledge of how students acquire subject knowledge as well” (p.88). Roberts (2017) coins the term ‘powerful pedagogy’, emphasising the students’ active involvement, critical thinking and understanding “through investigative approaches and classroom talk, in the construction” of knowledge and understanding (p.9). This pedagogy would enable students to establish connections between existing knowledge and new ideas,

between different pieces of information, and between different concepts (Puustinen and Khawaja, 2021; Roberts, 2013, 2014, 2017), helping them understand that economics "knowledge is not fixed or given; it is always fallible and open to challenge" (Young, 2013a, p.107). It would engage students to recognise the political and economic nature of issues in economics, help them to move from the familiar to the strange, ask questions that challenge the status quo, probe ethical issues, consider underlying political and economic structures, treat economic models as explanatory tools, give relevance to real-world data, and support the construction of frameworks of knowledge which make connections and generalisations possible. Students would be inducted into the world of disciplinary economics. A powerful pedagogy is the means by which teachers can enable students to engage with powerful knowledge in economics (e.g., Bustin, 2019; Puustinen and Khawaja, 2021; Roberts, 2014).

5.5 A framework

The framework discussed in this chapter is one where the teacher's pedagogy interacts with the disciplinary knowledge in economics to enable the students to start to think in the subject, perceive the world through an economic lens, and acquire disciplinary knowledge (Figure 11). This process of curriculum making occurs in the context of the discipline of economics where teachers engage "with the intellectual content of teaching", emphasising "the relationship between the subject content and the disciplinary communities from which it is selected" (Lambert and Biddulph, 2015, p.3). Teachers need to carefully consider and manage three interrelated priorities, being the students, the secondary school economics curriculum and the pedagogy. The curriculum comes into being via the interactions between these three dimensions (Lambert and Biddulph, 2015; Mitchell and Lambert, 2015).

Teachers learn about their students' needs, prior knowledge and lived experiences. These are then utilised during the teaching and learning process, consciously creating "spaces for geniune dialogue" between the students, the teachers and the curriculum (Lambert and Biddulph, 2015, p.220). Teachers engage both with their students, contrary to what happens in a Future 1 scenario, and with the subject discipline, which is undermined in a Future 2 scenario. An over-reliance on the subject content or on pedagogic techniques and inadvertently ignoring "the interests, experiences and motivations of young people may lead, in the worst case scenario, to a curriculum with

inert contents that students have difficulty in grasping in terms of its significance or relevance" (Lambert and Biddulph, 2015, p.215).

The second dimension relates to the school economics curriculum. Teachers are aware of the nature and purpose of economics and whether their teaching is steeped into the dominant neoclassical paradigm. An antidote to this is being familiar with the history of economic thought and the other schools of economics. Perceiving the discipline as a social science and emphasising its explanatory function widens the teachers' perspectives.

The other dimension, pedagogy, facilitates the acquisition of economics threshold concepts, giving students access to powerful economics knowledge. Through their pedagogic decisions teachers can provide epistemic access and bring to life a curriculum that "may appear to be as dry as dust" (Lambert and Biddulph, 2015, p.221). Through their knowledge of the school economics curriculum, pedagogy and their students, teachers empower young people to start to think in the subject, perceive the world through an economic lens, and acquire disciplinary knowledge in economics that educates them beyond their current knowledge and experiences (Figure 11).

The interactions between these three dimensions is influenced by a number of 'context' and 'process variables' (Kyriacou, 2009). Context variables refer "to all those characteristics of the context of the learning activity, usually a classroom-based lesson, which may have some bearing on the success of the learning activity" (ibid., p.8). These include characteristics relating to the teacher (e.g., gender, age, personality, experience, social class, ideology, education, and subject knowledge), the students (e.g., age, gender, ability, values, personality, social class, cultural background, interests, friendships, and attitudes to learning), the class (e.g., size, range of ability, general interest, and cultural mix), the learning environment (e.g., space, layout, resources, and flexibility), the school (e.g., size, buildings, facilities, ethos, disciplinary policy, intake, and location), the community (e.g., affluence, population density, and geographical location), and the occasion (e.g. time of day, preceding lesson, weather, and period of academic year). Process variables refer "to what actually goes on in the classroom, and deals with the perceptions, strategies and behaviour of the teacher and pupils, and characteristics of the learning tasks and activities themselves, and how these interact with each other" (ibid.). These factors include the teacher's enthusiasm, the organisation of the lesson, the strategies for

learning, the questioning techniques, the use of praise and criticism, the disciplinary measures, the classroom climate, the students' involvement, and the type of feedback they receive. Keeping in mind the context and process variables when exploring economics teaching and learning helps to cultivate an attitude of awareness to variability; these factors need to be taken into consideration as "what happens within classrooms is by no means standard, and that it is influenced by all kinds of different factors" (Unwin and Yandell, 2016, p.37).

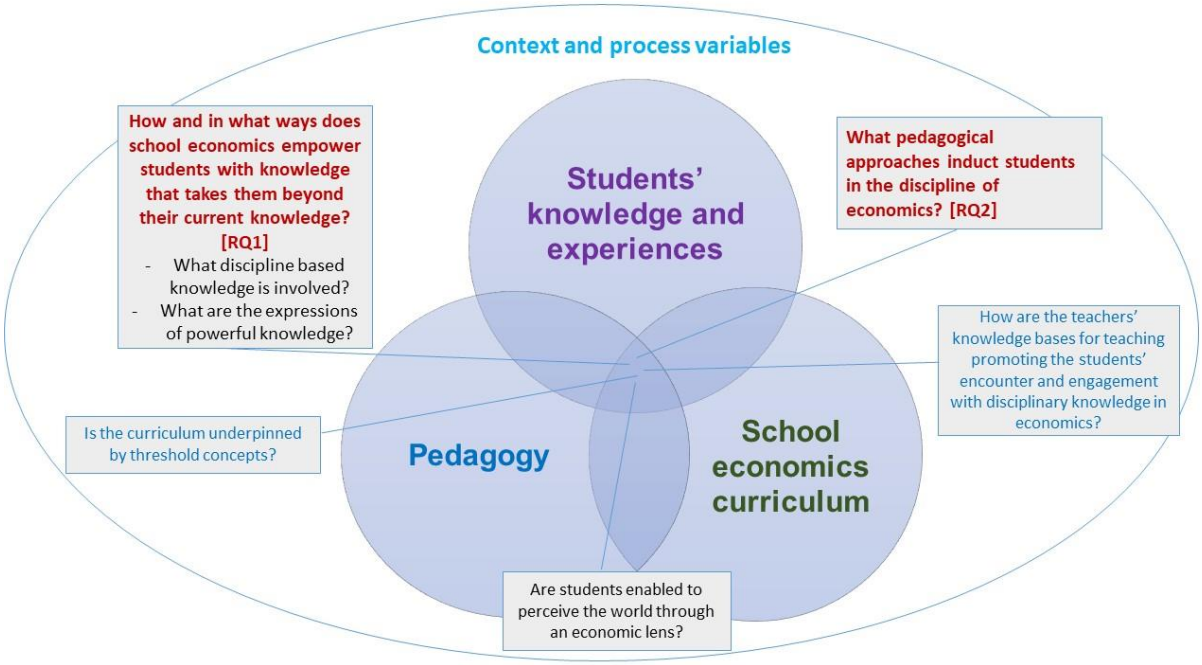

Figure 11. Curriculum making in secondary school economics (adapted from Kyriacou, 2009; Lambert and Biddulph, 2015; Mitchell and Lambert, 2015)

Perceiving secondary school economics education as the interaction between the three dimensions of the students, the secondary school economics curriculum and the pedagogy (Figure 11) provides a conceptual framework for analysing how students acquire disciplinary knowledge in economics that educates them beyond their current knowledge and experiences (research question 1) and what pedagogies are appropriate to their induction in the discipline of economics (research question 2). As regard the first research question, the discipline based knowledge involved in the learning experience also needs to be explored, together with an analysis of the expressions of powerful knowledge in economics. For example, when students are provided with learning experiences that help them grasp the threshold concept of price, they would gain epistemic access to an understanding of the forces relating to

competition in markets, the determination of the market price, and a deeper understanding of how market structures operate. The knowledge gained would provide a deeper understanding of the mechanisms and structures operating in the economic world around them and would be one that is “nearer to truth about the world we live in and to what it is to be human” (Young, 2013a, p.107).

This conceptual framework focuses my research upon an analysis of the disciplinary knowledge underpinning the enactment of the secondary school economics curriculum, whether the students are engaged with the ways of thinking and practising economics that enable them to perceive the world through an economic lens, and how the teachers’ pedagogical approaches facilitate the students’ encounter and engagement with the disciplinary knowledge in economics. This framework draws upon and synthesises the literature reviewed in the thesis (chapters two, three and four).

5.6 Conclusion

This chapter has discussed the characteristics that make economics knowledge powerful and the powers this knowledge gives to students. This is essential for Future 3 curriculum thinking in economics. If students are to be enabled to think differently about the world and to use economics to facilitate “debates about alternative policies” which “contribute in some cases to a society’s conversations about itself” (Young and Muller, 2014, p.62), teachers would need to reflect about what constitutes powerful knowledge in economics. In fact, a Future 3 economics curriculum would invite teachers “to identify opportunities in the curriculum to engage students with concepts in ways they might not previously have considered” (Maude, 2016, p.70). They would need to seriously consider their role as curriculum makers and the importance of a powerful pedagogy which is best suited to realising economics’ potential as powerful knowledge in schools.

The following chapter discusses the methodology used in this thesis.

6. Methodology

This chapter explores the research questions and the conceptual framework underlying this study. It discusses why a qualitative methodology was employed, considerations regarding my position as the researcher, the methods adopted, the procedures for the analysis of the data, and issues related to ethical conduct.

6.1 Research questions

This research study addresses the following two primary research questions. The first one explores how secondary school economics education enables students access to powerful disciplinary knowledge in economics. The second question researches the enactment of classroom pedagogies which promote the students' engagement with powerful knowledge in this subject.

1. How does economics offer secondary school students powerful knowledge that enables them to think beyond their everyday knowledge and experience?

The following operational research questions guide this overarching research question:

a) What makes such knowledge powerful?

b) What does it mean to think in the subject?

2. How do teachers enact a curriculum underpinned by powerful knowledge?

Two sub-questions guide this research question:

a) What pedagogies provide students access to powerful knowledge in economics?

b) How can these pedagogies develop an understanding of powerful knowledge in economics education?

I adopted a qualitative research approach aimed at developing a deep understanding of teaching and learning in the secondary school economics class. Qualitative research allows in-depth analysis, the investigation of highly sensitive issues and the making of comprehensive subject evaluation together with keen insight (Clough and Nutbrown, 2012; Charmaz, 2014; Cohen et al., 2011, 2018; Grbich, 2013; Punch, 2014; Trafford and Leshem, 2008). Such an approach enabled me to address the research questions by enabling face-to-face interaction with the participants and allowing for in-depth data together with detailed insights and experiences to be

gathered (ibid.). I also used secondary data, such as the economics syllabus and policy documents.

The research questions are rooted in the belief that there exists a reality, and that the participants and I as the researcher bring our own beliefs, values and experience to the study. The philosophical framework I adopt is critical realism. This research is an attempt at describing, understanding and interpreting the reality relating to economics education as experienced by the students, the teachers and myself as the researcher. It is in this sense that this thesis is not a critical realist one.

6.2 Conceptual framework

Critical realism is a philosophy originally developed by Roy Bhaskar in the 1970s and developed over the following decades. The term is derived from two connected philosophical ideas: transcendental realism and critical naturalism. The underpinning argument of transcendental realism as a philosophy of science is that although the world is real, it is not necessarily directly accessible and therefore needs to be understood through the structures and mechanisms at play (Anderson, 2021; Bhaskar, 1979, 2017; Brant and Panjwani, 2015). Science is perceived as a social process exploring "a world outside it which is moving from one level of reality we have knowledge of to a deeper level which explains it in an indefinite process" (Bhaskar, 2017, p.30). Critical naturalism is a theory of social science which has originated as a scientific alternative to both positivism and constructivism (Denzin and Lincoln, 2011), but draws elements from both methodological strains in its account of ontology and epistemology (Lawson, 1997). Critical realism assists "an understanding of the world that is real but which may be differently experienced and interpreted by different observers" (Brant, 2015, p.11). Braun and Clarke (2013) describe critical realism

> like looking at a view where the only way to see it is through a prism, so what is seen is nuanced by the shape of the prism (the prism is culture, history, etc.). If you could just get rid of that prism, you'd be able to see what lies behind it (the truth), but you never can get beyond it. (p.28)

This research study is underpinned by an understanding that ontology is real and epistemology is relativist; ontology (that is, what is real, the nature of reality) is not reducible to epistemology (that is, our knowledge of reality) - there is a 'real' world and it is theory-laden and not theory-determined (Fletcher, 2017). Human knowledge in all fields of enquiry captures only a small part of a deeper and vaster reality (Young,

2013a). The epistemological basis is one of a relationship and interaction between the researcher and participants with values and beliefs being made explicit and the findings being created. Participants might have been subject to influences which shaped their world view and of learning in economics, and so they might have been reflecting different interpretations of reality. Their responses might have been inextricably linked with their conceptions of learning and reflecting different assumptions and backgrounds. Shaikh (2013) argues that participants in any social act will have different views on the act itself and the outcomes. People develop their own beliefs and understanding of phenomena; but in forming these perspectives there are bound to be elements of inconsistency and bias: the principle of fallibility (Soros, 2013). “Knowledge is not fixed or given; it is always fallible and open to challenge” (Young, 2013a, p.107). Even the perspective of one individual might be influenced by different values, which in themselves may be inconsistent (Shaikh, 2013). Eraut (1994) cautions that

> while classroom research may describe and interpret teaching activities, it still needs to acknowledge that seeing like an observer cannot be same as seeing like a teacher. A teacher sees from within the action, not from outside; and can only temporarily escape from a complex network of moral obligations to review selective aspects of his or her behaviour. (p.31)

This study therefore attempts to capture aspects of the reality of powerful knowledge and pedagogy in Maltese school economics by exploring the views and perspectives of teachers and students and observing actual lessons. The emerging story is based on the assumptions and beliefs that myself and the participants bring to the study.

6.3 My position as the researcher

The choice of which research approach to select is a deliberative decision influenced by the research objectives and by the researcher’s own perception of which methodology is more suitable to address the research questions (Clough and Nutbrown, 2012; Cohen et al., 2011, 2018; Creswell, 2009; Creswell and Creswell, 2018; Gorard, 2013). Two major styles of research are the qualitative and the quantitative research methodologies.

Quantitative research is linked with data quantification and a positivistic methodology which, in terms of critical reality, attempts to explore the ontology of the natural world. It tends to adopt a deductive approach, which tries to develop a hypothesis and then design a research strategy to test that hypothesis. Quantitative research favours a

macro approach in relation to the issue being investigated, aiming to generalise beyond the sample to the wider population. The collection of data leads towards the generation of factual knowledge, being the result of quantifiable observations leading to statistical relevance. Quantitative research is more suitable than the qualitative approach where investigations involving large number of participants are involved, allowing for the possibility of forming generalisations through the results obtained (Gorard, 2013; Holloway and Todres, 2003; Punch 2014; Robson, 2005; Robson and McCartan, 2016). It offers a higher possibility than qualitative research of a successful replication of a study; in this sense it is stronger in reliability than qualitative research (Cohen et al., 2011, 2018; Creswell, 2009; Creswell and Creswell, 2018; Robson and McCartan, 2016). Quantitative research is however criticised for being less successful when it comes to study human behaviour. In this case, the complexity of human nature and the elusive and intangible quality of social phenomena come in stark contrast with the order and regularity of the natural world (Cohen et al., 2011, 2018; Creswell and Creswell, 2018; Gorard, 2013; Lawson, 1997; Robson and McCartan, 2016).

Qualitative research refers to an array of attitudes towards and strategies for conducting inquiry aimed at exploring how participants understand, experience and interpret the world. It gets into more depth than the quantitative research approach, providing a more detailed understanding of meanings, actions, observable and non-observable phenomena, attitudes, intentions and behaviours (Burgress, 1990; Cohen et al., 2011, 2018; Creswell, 2009; Creswell and Creswell, 2018; Denzin and Lincoln, 2011; Gorard, 2013; Holloway and Todres, 2003; Punch 2014; Robson, 2005). It "gives voices to participants and probes issues that lie beneath the surface of presenting behaviours and actions" (Cohen et al., 2018, p.288). In this manner, a qualitative researcher explores the epistemology or participants' knowledge of reality. It is therefore pivotal that s/he gains the trust of the participants and establishes a working relationship with them (Denzin and Lincoln, 2011; Gorard, 2013; Robson, 2005; Robson and McCartan, 2016).

I decided to adopt a qualitative research methodology because it addressed better the purpose, objectives and research questions of this study. In particular, it provided an approach that facilitated the exploration of the reality of economics education as perceived by the students and the teachers and my own lesson observations. It fits in within a critical realist conceptual framework that searches for meaning in economics

education, perceiving ontology as real and epistemology as relativist. Thus, within this qualitative research study underpinned by a critical realist conceptual framework, I attempted to capture aspects of the ontology of teaching and learning of economics by exploring the epistemology of teachers and students and my own observations.

One important issue when discussing qualitative research is researcher positionality. This reflects the social and political landscape occupied by the researcher within the research study (Foote and Bartell, 2011; Savin-Baden and Howell Major, 2013; Wood Wallace, 2012). If a researcher employs the methods used by another researcher in another research study, s/he is likely to arrive at different conclusions and recommendations; different researchers bring diverse perspectives, observations and experiences to bear on the data collected (Gorard, 2013; Wolcot, 1994). These inevitably have impact on the results and recommendations of the research study; the researcher might become "as much a part of the research process as the participants and the data they provide" (Corbin and Strauss, 2015, p.4). It is therefore important that during the course of the research, s/he tries to maintain self-awareness of his/her direct involvement: "assumptions, values, perspectives, experiences, and professional background enter into the decisions that a researcher makes during each phase of the research process but especially during data collection and analysis" (ibid., p.54). Lincoln and Guba (1985) maintain that "inquiry is not and cannot be value free" (p.9). Braun and Clarke (2013) claim that "an analysis of qualitative data tells one *story* among many that could be told about the data ... You don't need to be claiming to tell the only or absolute truth to be telling a compelling 'truth' about your data" (pp.20-1). What is important is that the research

> gives another insight and understanding into human behaviour. It is the accumulation of knowledge over time that is most important, and the more theories professionals and laypersons have to explain what is going on around them, the better able they are to shape lives. (Corbin and Strauss, 2015, p.25)

Positionality is important because it implies that researchers are able to defend their conclusions and recommendations because of their background and perspectives (Ashwin, 2015). Validity in qualitative research is defined as the degree to which a study accurately represents the realities of the participants and the phenomena that it is intended to describe or explain (Corbin and Strauss, 2015; Wolcott, 1994). In any research, the subjectivity of respondents, their opinions, attitudes and perspectives contribute to a degree of bias (Attride-Stirling, 2001; Cohen et al., 2011, 2018; Robson,

2005; Robson and McCartan, 2016). The best one can do is to strive to be aware of this bias, minimise invalidity and maximise validity (ibid.). A researcher needs to strive to adhere to credibility, transferability, dependability and confirmability, being proposed as the key criteria of validity in qualitative research (Guba, 1981; Lincoln and Guba, 1985; Nowell et al., 2017). The emphasis is on establishing trustworthiness (ibid.) and authenticity (Cohen et al., 2011, 2018).

Reliability has been defined as "the extent in which the findings of a study can be replicated" (Sin, 2010, p.310). In qualitative research studies, unlike quantitative ones, there are aspects which will be different if the study is replicated by another researcher; "different researchers, with different tools, can produce different analyses from the same data" (Braun and Clarke, 2013, p.225). This difference is due to the interpretation and analysis of the results because of the position of the researcher (Corbin and Strauss, 2015). By drawing upon the experience of a sculptor who assembles more than one piece of sculpture from different pieces of metal, these researchers explain how

> not just one piece of "sculpture" or theory can be created from the same group of materials or data ... Another analyst may arrive at a different theory. As with different sculptors, even when working with the same material, different outcomes are possible. (p.58)

I attempted to maximise the rigour of my qualitative research study by acquiring data from different sources, being clear in the procedures I used, refuting assumptions against the data as I proceeded through the research, seeking alternative explanations and themes which did not simply reinforce existing theoretical positions, taking note of all data including deviant cases (negative case analysis), and debriefing with my supervisor and a trusted critical friend. Regarding lesson observations, for instance, I kept myself aware of the observer's effects, monitor them and take them into consideration during data analysis. Efforts I made to minimise these effects included building a rapport with the participants, becoming a part of the crowd, and being cautious not to disrupt the natural activities and behaviours in the classes visited (e.g., Cefai, 2007).

The quality of my research is enhanced through myself as the researcher self-disclosing biases, assumptions and beliefs which might have impacted on the study. I am aware that as an individual researcher I worked in isolation. Hence, reliability measures such as coder reliability check and dialogic reliability check were not an

option. However, I strived to build in reliability by attempting to seek a form of dialogic reliability check by discussing the preliminary findings with my supervisor and a critical friend.

I am aware that my own actions as a researcher and those of the participants involved in my study might have behaved in relation to my perspectives and might thus have impacted on the reality of the study. This is implied by the principle of reflexivity (Corbin and Strauss, 2015; Creswell, 2013; Lincoln and Guba, 1985; Savin-Baden and Howell Major, 2013; Shaikh, 2013; Soros, 2013; Wood Wallace, 2012), "in which the writer is conscious of the biases, values, and experiences that he or she brings to a qualitative research study" (Cresswell, 2013, p.216). The situation studied might have been influenced through the actions of the participants. This is further clarified when Soros (2013) claims that "participants' thinking is part of the reality that they have to think about, which makes the relationship circular" (p.310). This circularity described by reflexivity is characterised by a two-way feedback process between the participants and the observer (Beinhocker, 2013); "Human beings are always in relationships – with one another and with the investigator as well" (Lincoln and Guba, 1985, p.105). The attempt of participants at understanding the world has been referred to as the cognitive function and the intention to make a difference and advance the participants' interest as the manipulative function (Soros, 2013). Soros argues that these functions can operate at the same time and create interference: the independent variable of one function becomes the dependent variable of the other, creating a circular or recursive relationship. Reflexive feedback loops are created, inevitably following Soros's notion of fallibility: "fallible agents try to understand and act in an environment of fallible agents trying to understand and act in an environment of fallible agents trying to understand ..." (Beinhocker, 2013, p.334).

In considering positionality, I am attempting to make the reader aware of my location in the field, mainly in relation to the subject under consideration, the participants and the research context and process. Reflexivity is the process I adopted to ensure that positionality was not detrimental to research. This included reflexive journaling through keeping a field diary and acknowledging bias generated through not acknowledging my assumptions and my ethical positions. This reflexivity helped me to respond critically and sensitively to the research and build quality into it.

My own perspective on economics teaching and learning (my bias) is on fostering interest in this discipline and helping students to 'think in the subject' (e.g., Arnold, 2005; Ashwin, 2015). A useful framework in trying to understand in this way learning in economics is provided through the notions of powerful knowledge, Futures of school knowledge, knowledge bases for teaching, pedagogical content knowledge, and threshold concepts. During my research study, I interpreted the data in the light of these beliefs and approaches. It is therefore inevitable that my interpretations are likely to be different to that of other researchers attempting to undertake a similar study. In addition, the way in which I approached the design and methods used in the study was influenced by personal circumstances. As a part-time researcher, I had to make trade-offs which affected the way the study was carried out, how the data was collected and, as a consequence, the results.

I was aware of the naturally generated interviewer-interviewee power-differential, especially the student-teacher power relations when interviewing students. My role as a teacher educator from the University might also had its effects on the research process; I kept myself aware in identifying these effects, which might had related to concerns about the power-differential. Also, in a small island like Malta, it might happen that you know some participants (teachers, students, and/or their parents/guardians). Factors that were important in helping me to rise above this power-differential in encouraging participants to recount their experiences was the sustained empathic and non-judgemental attitude of myself as a researcher I strived for and the willingness and communicative skills of the respondents.

I also kept in mind the research context in which a participant (teacher or student) was operating. Some respondents were teaching in Church schools, others in Independent schools - the pressures and expectations which were associated with each sector and school were different. Each participant from every school had a set of 'truths', and the researcher was no different.

The study therefore represents the views and perceptions of the participants who were involved. It does not aim to present results which can be generalised across the learning of economics; further new research, evidence and thinking might lead to revised accounts. I have worked to tell not the 'one true story' about the data collected but "a story that is faithful to the data" (Braun and Clarke, 2013, p.233). I hope that this story helps in understanding better economics education at secondary school level

and in drawing conclusions about issues which can provide the basis for further consideration. These conclusions are based on the assumptions and beliefs that I bring to the study.

6.4 Methods

Critical realists contend that “at different stages of the scientific process, different kinds of methods are called for” (Bhaskar, 2017, p.49). Similarly, Lincoln and Guba (1985) claim that “no single item of information (unless coming from an elite and unimpeachable source) should ever be given serious consideration” (p.283) unless different sources of evidence are employed. Strauss and Corbin (2015) argue that “researchers should include as many different perspectives on an issue or topic as feasible. Multiple perspectives add insight, richness, depth, and variation” (p.308).

To generate these rich insights about the complex reality of powerful knowledge and pedagogy in Maltese school economics, I decided to use different methods consisting of interviews with teachers, focus group interviews with students, and lesson observations. Apart from complementing each other, it was intended that these methods provoked different insights and perspectives. For instance, observations might shed light on the meaning that interviews might not fully capture, and vice versa (Phoenix and Brannen, 2013). The challenge and opportunity for me as the researcher was to interact with the research participants in such a way as to facilitate the generation of rich and complex insights.

6.4.1 Interviews with teachers

Interviewing is a time consuming and labour-intensive data generation method (Biggs, 2011; Bouchard, 1976; Burgess, 1990; Cohen et al., 2011, 2018; Cutajar, 2017; Ogier, 1998). However, it gives the researcher access to the participants’ way/s of seeing and relating to the phenomenon under consideration and listening to their stories, whilst providing for the possibility of clarifying a participant’s response at source where deemed necessary (Charmaz, 2014; Silverman, 2000, 2014).

The rationale for the interviews with the teachers and the students was to allow them to express their understanding of their perceived reality of powerful knowledge and pedagogy in economics education at secondary school level. I therefore decided that semi-structured interviews were the best fit for this purpose. This type of interview is guided by a number of standard questions with additional unstructured follow up

questions, enabling the researcher to flexibly address the main aspects that need to be discussed to answer the research questions. The discussion generated enables the researcher to enter into more depth about issues raised by the participants by making use of adequate probing questions, adding or omitting further questions during the course of the interview depending on how the discussion evolves. My choice in favour of semi-structured interviews offered this degree of flexibility in an attempt to adequately address the research questions.

6.4.2 Focus group interviews with students

A focus group interview enables a researcher to gain insight into the shared understandings and beliefs of participants, while allowing individual differences of opinion to be voiced. It provides information about the range of ideas and opinions held by members of a group and highlights inconsistencies of beliefs among members in a particular community (Cresswell, 1998; King, 2004; Savin-Baden and Mayor, 2013). Focus groups are economical on time, producing a large amount of data in a short period of time by empowering participants to speak out (Cohen et al., 2011, 2018). They also enable participants to hear the views and experiences of their peers and cause them to reflect back on their own experiences and thoughts. Because of these considerations, I decided to use student focus group interviews instead of the individual interview with students.

Considering the students' voice through focus groups can lead to a better understanding of student learning in a subject and facilitate the teaching in a discipline (e.g., White et al., 2016); "scholars and teachers should take seriously the experiences and insights of students as learners" (Land et al., 2016, p.xiii). Students have important things to say and it would benefit school and society to listen to them (Cohen et al., 2011, 2018).

6.4.3 Observations

Observations are an important form of data collection (Braun and Clarke, 2013; Cohen et al., 2011, 2018; Corbin and Strauss, 2015). The latter argue that

> persons are not always aware of, or able to articulate, the subtleties of what goes on during interactions between themselves and others. Observations place researchers in the centre of the action where they can see as well as hear what is going on. (p.41)

Lesson observations allow researchers to gain a more objective view of the reality being investigated, such as giving access to observe the interactions between a teacher and the students in a classroom.

The drawback of lesson observations is that of any potential preconceptions of the researcher (e.g., Cohen et al., 2011, 2018; Corbin and Strauss, 2015). For instance, "a researcher may give meaning to a witnessed action-interaction, but unless that meaning is checked out with participants, the researcher's interpretation may or may not be correct" (Corbin and Strauss, 2015, p.41). It is therefore recommended to briefly follow up with participants to clarify what appeared to be significant behaviour. Eraut (1994) argues that "oral questioning after an observation can probe a candidate's knowledge about the whys and wherefores and inquire about how they would act differently under different circumstances" (p.195). Once researchers become aware of their own preconceptions, they can 'bracket' these from a background of teaching and learning and represent a reality which is not dependent on them (Creswell, 2009, 2013).

A researcher needs to be aware that "the notion of observation is alien to the essentially private nature of teaching as an occupation and a potential threat to teacher autonomy" (Eraut, 1994, p.38). This implies, for instance, being grateful to those teachers who provide access to their lessons.

Observation situations involve observer effects and reactivity (Cohen et al., 2011, 2018; Corbin and Strauss, 2015; Creswell and Creswell, 2018; Savin-Baden and Howell Major, 2013). The researcher's presence might have an effect on the situation; participants might alter their behaviour when they know that they are being observed. For example, students may work harder during lessons, teachers may prepare better lessons, and participants may act in a manner they perceive the researcher wishes them to.

6.4.4 Piloting

A pilot study serves a number of functions. It helps to re-shape the interview questions, and the researcher gains feedback on the type of questions asked, eliminates ambiguities or difficulties in wording, and identifies redundant questions (Cohen et al., 2018). S/he is also provided with experience and confidence in undertaking the interview and the observations (Creswell, 2009, 2013; Merriam and Tisdell, 2015);

s/he needs to keep in mind that “interviewing and observing are skills that take training and practice to acquire” (Corbin and Strauss, 2015, p.37).

I piloted the instruments for their efficacy; the data from the piloting was not included in the study. The process of piloting developed the instruments to be fit for purpose for my study.

6.5 Student enrolment in Maltese secondary school economics education

This section provides more context relating to the students studying economics at secondary school level. The main examination that students finishing their secondary education can apply for is the Secondary Education Certificate (SEC) examination. Table 2 shows the number of registrations for economics in 2019 (when the data was collected). Table 3 then shows the registrations from the three educational sectors.

Males	Females	Total
118	125	243

Table 2. Registration by gender (MATSEC, 2019)

State schools		Church Schools		Independent Schools	
Males	Females	Males	Females	Males	Females
1	5	66	78	39	32

Table 3. Registration by school type and gender (MATSEC, 2019)

The trend in the number of students sitting for their SEC economics examination during these last 11 years is illustrated in Table 4. This has remained relatively stable.

2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
188	196	249	229	191	233	252	255	247	254	244

Table 4. Number of students sitting for the SEC examination (MATSEC, 2011 - 2021)

The student enrolment in school economics education in Malta faces similar challenges as those experienced by other countries (e.g., Abbott, 2003; Brant and Cullimore, 2012; Shanks, 2020; Watts and Walstad, 2010). Since economics is not on the national curriculum and is an optional subject post-16, it does not enjoy the prominence of other subjects and competes for students with the other subjects on offer.

6.6 Recruiting the research participants

Since the population of Maltese economics secondary school teachers was relatively small consisting of 24 teachers, my aim was to recruit as many as possible of these teachers; each teacher would be bringing into the research an understanding of the economics teaching and learning process. Consequently, I decided to adopt two recruitment strategies, which were implemented at the beginning of scholastic year 2018-2019. The first approach consisted of formally emailing an invitation through the Head of Department for economics to all teachers to participate in the study (18 in Church and six in Independent schools). If the number of participants was not satisfactory, the second strategy involved contacting myself teachers through my networks in schools, colleagues and the economics Head of Department. Seven teachers responded to my invitation sent by email, and a further seven were willing to participate when contacted personally through my networks. This recruitment of 14 participants consisted of 11 teachers from Church schools and three from Independent schools.

I asked the teachers' permission to observe one of their lessons; ten teachers consented. I observed two experienced participants twice and two student teachers, Caroline and Charles, who were in their final year of their teacher education course. In total, I observed 14 lessons.

To explore the students' experiences and perceptions relating to poweful knowledge and pedagogy, I interviewed students studying economics. These were Year 11 students (roughly aged 16 years) who were about to finish their secondary school education and had been studying economics for the last three years. In 2018, the ratio of students sitting for their SEC economics examination from the Church and the Independent schools respectively was roughly 3:1 (see Table 5). I therefore decided

to conduct three student focus group interviews at the Church schools and one at an Independent school.

Church	Independent	Total
154	54	208
Ratio 2.85:1		

Table 5. Students sitting for their SEC economics examination in 2018 (MATSEC, 2018)

I decided to hold the student focus groups with the classes of those teachers who first agreed to assist me in carrying out these interviews with their students. This assistance involved distributing the information letter and consent form, collecting the signed consent form, and helping to identify a workable time slot for the interview. Since the groups of economics students were relatively small (an average of eleven students), I invited them all to participate in the interview. A total of twenty students participated in the interviews.

6.7 Collecting the data

This section discusses the data collection process. It spanned from March until October 2019.

6.7.1 Teacher interviews

During the process of interviewing teachers, I took measures to make them feel at ease whilst participating in the research. These included the assurance of anonymity and choosing a mutually agreeable location. I used impromptu probes such as “What do you mean?”, “Why?”, “How?”, “In what sense?”, “Can you please explain/elaborate more?”, “Is there anything else you want to add?”, or simply an encouraging “mmm” to encourage them to explain more fully their experience relating to economics education. This interviewing process was guided by the interview schedule (Appendix I).

I was attentive to my own conduct as an interviewer and tried to make participants feel comfortable. I was aware of the power relationship of being a University teacher educator. Most importantly, I tried not to lead interviewees and to listen to them in empathy. In this regard, I made a conscious effort to avoid passing judgemental

comments on the content of the conversation and to put aside personal and professional pedagogical perspectives. This ongoing conscious effort nurtured an empathic attitude that minimised my presuppositions, encouraged participants to speak their mind and enabled me to experience the other's world with minimum prejudice (Rogers, 1980). Attention to the cultivation of awareness (de Mello, 2000) on my own part was a great help during this process.

I audio-recorded the interviews. These lasted on average one hour twenty minutes. I wrote field notes during and after each interview to record any reflections on aspects of the interview, such as the ease with which the participants answered questions and the tone or feel of the interview. The writing of these field notes including any analytic reflections provided me with a source of data for formal analysis.

Table 6 provides further information about the participants. All names are anonymised.

	Pseudonym	Teaching experience in economics (years)	Year and class size during lesson observation
1	Stephen	10	No observation
2	Susan	8	Year 9: 5 boys
3	Franky	36	Year 9: 4 boys
4	Mary	20	Year 11: 11 boys
5	Grace	24	Year 9: 10 boys, 6 girls
6	Debbie	2	Year 9: 6 boys, 4 girls
7	Robert	2	No observation
8	Liberata	18	Year 10: 8 boys
9	Monica	22	Year 10: 8 girls
10	Claire	11	Year 10: 13 girls
11	Christy	8	Year 10: 16 girls
12	Carmen	20	No observation
13	Antonia	21	No observation
14	Ian	1	Year 9: 7 boys, 9 girls

Table 6. Characteristics of the teacher participants and class during observation

6.7.2 Student focus group interviews

I held these audio-recorded interviews between April and July 2019. These interviews were guided by the student focus group interview schedule (Appendix II). The four focus groups were mixed in ability and consisted of 20 Year 11 students. Two students, Oswald and Kyle, were unable to join in the focus group interview but accepted to be interviewed separately. Table 7 shows the characteristics of these focus group (FG) interviews.

	FG1	**FG2**	**FG3**	**FG4**	**Oswald**	**Kyle**
Number of students	4 boys	4 boys	4 boys, 3 girls	3 boys	1	1
Duration of interview (minutes)	35	58	24	44	13	25

Table 7. Characteristics of the student focus group interviews

On most occasions, participants contributed enthusiastically by sharing their perspectives and experiences. When this did not happen, I evaluated the situation quickly to determine the possible reason for silence in order to move the conversation forward. On those rare occasions when the group veered off task, I gently led the group back to the subject at hand. There were instances when students started having side conversations; unobtrusively I drew their attention towards the discussion and communicated that their responses were important to the research.

6.7.3 Lesson observations

Guided by the observation schedule (Appendix III), my aim during these observations was to observe aspects of the economics teaching and learning process relating to powerful knowledge and pedagogy in the subject. Table 6 provides information about the size and gender of the classes observed. These were mixed in ability. The average number of students in a class was 11. Students came from different family backgrounds bringing over to class different experiences.

I adopted the role of the ‘observer-as-participant’ (Cohen et al., 2011, 2018). The group knew that I was a researcher, and I interacted with the students if they

approached me. I tried however to minimise contact and participation as much as possible. This observing role assisted me to focus more into gaining insights about aspects of the reality concerning economics education. I also attempted to keep myself aware of reactivity effects, that is, the effects of the researcher on the researched. For instance, a teacher preparing and delivering a better lesson than s/he normally did, and improved student participation.

During the observations, I wrote notes describing the learning activities, the interactions that took place, and happenings that were relevant in addressing my research questions. I focused and took detailed notes on what was happening, what was being said and done by whom. After the lesson I clarified and followed up what appeared to be significant behaviour relating to my research questions. I wrote the observation notes immediately after the observations.

6.8 Analysis of the data

Strauss and Corbin (2015) suggest that "a researcher can think of analysis as 'mining' the data, digging beneath the surface to discover the hidden treasures contained within" (p.88). This process begins as soon as data starts being collected; the distinction between data collection (or 'data generation') and analysis is problematic, as the entire research process involves analytic judgements (e.g., Corbin and Strauss, 2015; Creswell and Creswell, 2018; Gibson and Brown, 2009; Riessman, 2008). It is an iterative process in which data collection informs and is informed by the developing analysis (Braun and Clarke, 2006, 2013; Cohen et al., 2011, 2018; Silverman, 2014); qualitative research is a "recursive rather than linear process; it often involves going sideways and backwards, as well as forwards, to reach the answers you're looking for" (Braun and Clarke, 2013, p.16).

During this process, I tried to maintain awareness of the potential for confirmation bias. This is the tendency to search for, interpret or remember information in a way that confirms preconceptions or working hypotheses. A useful approach in this regard was the two-systems approach to judgement and choice elaborated by Kahneman (2011): the distinction between 'System 1' and 'System 2'. System 1 is the intuitive response to external stimulus which constructs a coherent interpretation of what is going on in our world at any instant. System 2 attempts to give a sense of the complexity and richness of the automatic and often unconscious processes that characterise System

1 (ibid.). To enhance the rigour of my research, I tried to be sensitive to the automatic operations of System 1 and the controlled operations of System 2. During this process I strived to be open to different ways of perceiving and was attentive not to submit to the problem of natural attitude: believing that what I see is what is - that Reality and the experience of the world are taken to be one (Marton and Booth, 1997). Being aware of this potential pitfall helped me to understand the perspectives held in the data which did not match my own. For example, after the lesson observations, in an attempt to understand better aspects of powerful knowledge and pedagogy underpinning economics education, I tried to discuss with the teachers and the students particular learning episodes that had occurred.

During my research I attempted to discover realities and the human experience in terms of teachers' and students' conceptions of teaching and learning economics. In so doing, I was subject to the principle of fallibility as noted earlier in sections 6.2 and 6.3: in seeking to understand realities, the perspective developed was going to be subject to biases and inconsistencies (Soros, 2013). The principle of fallibility needs therefore to be borne in mind when reading my interpretations of the realities that the participants revealed.

6.8.1 Transcription

Transcription is a key part of analysis (Braun and Clarke, 2006, 2013; Jackson and Bazely, 2009; Riessman, 2008). The re-ordering of verbal data in a textual mode, crystallising it in a particular way, giving it shape and form is "part of the analytic process, part of the process of familiarising yourself with your data" (Braun and Clarke, 2013, p.173). It is one component of 'data reduction' (Braun and Clarke, 2006, 2013; Riessman, 2008), whereby the raw data is transformed into some new analysed structure. Braun and Clarke (2006) maintain that "time spent in transcription is not wasted, as it informs the early stages of analysis" and facilitates the interpretative skills required to analyse the data (p.88).

To maximise validity, I tried to transcribe all aspects of the interview data, even the most minute (Corbin and Strauss, 2015). I held back from outsourcing the time-consuming research-related chores of verbatim transcription of the interviews and the Maltese-to-English translations; in this way I was very familiar with the transcripts and cross-checking my own work. I made it a point to work on the verbatim minutes in

whatever language the participant used, thus avoiding another layer of interpretation. Whilst engaged in the transcription task, I kept a critical ear listening to my own utterances as an interviewer. This served, for instance, to identify transcript excerpts to be discarded because of what was deemed as interviewer imprint.

6.8.2 Thematic analysis

Thematic analysis is widely used in qualitative research (Braun and Clarke, 2006, 2013; King, 2004; Nowell et al., 2017). Braun and Clarke (2006, 2013) advocate its use as a flexible method of data analysis capable of dealing with complex qualitative data which can provide a rich account of the data concerned. They suggest “a process for a systematic and thorough engagement with the data” (Braun and Clarke, 2013, p.236) and maintain that it “should be considered a method in its own right” (Braun and Clarke, 2006, p.78). Thematic analysis is a process of pattern recognition within the data, where emerging themes become the categories for analysis (Attride-Stirling, 2001; Boyatzis, 1998; Braun and Clarke, 2006, 2013; Fereday and Muir-Cochrane, 2006; Jackson and Bazely, 2019). It is “a useful method for examining the perspectives of different research participants, highlighting similarities and differences, and generating unanticipated insights” (Nowell et al., 2017, p.2), and at the same time recognising the researcher’s own bias which inevitably informs some of the interpretation of the data and the creation of themes (Boyatzis, 1998).

Braun and Clarke (2006, 2013) explore four ways in which researchers employing thematic analysis can approach their data. One can engage with the data in a semantic way where “themes are identified within the explicit or surface meanings of the data, and the analyst is not looking for anything beyond what a participant has said or what has been written” (Braun and Clarke, 2006, p.84). A researcher can approach the data in a latent way where s/he focuses on exploring “the underlying ideas, assumptions and conceptualisations” (ibid.), in a realist way where the researcher describes an assumed reality identified in the data, and in a constructionist way where a reality is produced by the data. There are similarities between these different models of thematic analysis; “what is important is that the finished product contains an account - not necessarily that detailed - of what was done, and why” (Braun and Clarke, 2006, p.86).

Thematic analysis is often classified as theoretical or deductive (Boyatzis, 1998), data-driven inductive (ibid.), deductive with a-priori codes/template (Crabtree and Miller, 1999), or as an inductive-deductive hybrid (Fereday and Muir-Cochrane, 2006). This research study adopted an inductive analytic approach which focused on analysing the themes and the patterns across the data set relating to powerful knowledge and pedagogy in school economics. The analysis process was focused and guided by the study's research questions and by the conceptual framework developed in chapter 5 relating to powerful knowledge and pedagogy in secondary school economics. My task in this thematic analysis approach was to generate themes and patterns from the data that narrate a story about powerful knowledge and pedagogy in school economics.

6.8.3 Coding and theme identification

During this process, I read the transcribed data repeatedly with a degree of openness, expending effort in trying to get to the meaning of what was being said with regard to powerful knowledge and pedagogy in economics education. To gain a better understanding of the data, I unpacked the accounts available, asking questions such as, "What's going on here?", "So what?", "How do these accounts address the research questions?" and "How can I make sense of these accounts?". I looked for natural breaks in the transcripts, a section or paragraph, which might denote a change in topic. I avoided working with too large of a section of data, because it tended to become cumbersome and overwhelming. Then I started to create codes as required. I strived to 'listen' to the data, asking such questions as "What is this about?", "Why is it interesting?" and "How does this relate to my research questions?" The length of the coded textual data varied from a few words to a whole paragraph.

I first coded the teacher interviews, then the student focus group interviews, and lastly the observations. I worked systematically through the entire data set, giving full and equal attention to each data item when assigning it to a code. I paid attention that codes had explicit boundaries so that they were not interchangeable or redundant. I coded individual extracts of data in as many different codes as they fitted. In due process, I took note of aspects in the data items and emerging impressions that captured an aspect of the qualitative richness of a theme or issue in the data that might form the basis of themes across the data set. These related to answering my research questions. This hierarchical coding allowed me to analyse the texts at varying levels of specificity with broad higher order codes providing an overview and detailed lower

order codes allowing for distinctions to be made within and between cases. The two main higher order codes related to the two primary research questions: ‘powerful knowledge’ and ‘powerful pedagogy’ in school economics. Each included lower order codes. The theme ‘powerful knowledge’ included the codes ‘threshold concepts in economics’, ‘knowledge that enables a deeper understanding of the economic world’, ‘knowledge that equips the students with new ways of economic thinking’, and ‘knowledge that develops students’ criticality of thought in economic issues and their participation in economic debates’. These codes emerged from the data but were also informed and guided by the framework I developed in chapter 5 conceptualising powerful knowledge in school economics (Figure 9); this framework assisted to focus my analysis. The codes relating to ‘powerful pedagogy’ included ‘connecting economics to real life’, ‘emphasising the process of reasoning’, ‘employing the teachers’ professional knowledge bases to develop PCK representations’, and ‘adopting a variety of teaching strategies’.

During this coding process I retained flexibility; it was not a one-stage process but a cumulative one, with the structure of codes evolving over time. For instance, as I reviewed data coded at a code, I perceived ways how to improve my coding. For example, including more of the context around the coded content, removing some of the coded content, developing ideas by coding content to other codes, and reorganising codes as I developed an idea. I tried to keep codes organised so that I could find them easily during the coding process. I pruned them regularly, merging, reorganising and renaming. Handling this qualitative data was an iterative process where I explored the data, reflected upon it, coded it, and so on. NVivo qualitative data analysis software assisted me in managing, searching and retrieving the transcribed data and the codes and themes I created (Jackson and Bazeley, 2019; Richards, 1999).

As I gradually started to identify broader patterns, I started to group codes together under one or more categories and sort and collate all the potentially relevant coded data extracts into themes. Whilst a code captures one idea, a theme “captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set” (Braun and Clarke, 2006, p.82). A theme has a central organising concept which tells something meaningful and important in relation to the research questions; it contains

different ideas or aspects related to the central organising concept. For example, one of the first emerging themes relating to the second research question was ‘connecting school economics to real life’. Its central organising concept is how teachers attempted to use real-life experience to assist their students in making sense of economic theory. Particular facets of this theme that developed during the analysis process included codes relating to how teachers drew upon their own experiences, the life experiences of their students, and examples from the economic environment. These codes combine to form a theme relating to a powerful pedagogical practice that promoted the students’ engagement with disciplinary knowledge in economics.

The identification of themes required a great deal of interpretative work. During this process, I asked myself questions such as, “What does this theme mean?”, “What are the assumptions underpinning it?”, “What are its implications?”, “Does the central organising concept tell me something meaningful about a pattern in the data in relation to my research questions?”, “What conditions are likely to have given rise to it?”, “Why do participants talk about this issue in this particular way (as opposed to other ways)?”, “Can I identify the boundaries of this theme? What does it include and exclude?”, “How does this theme relate to the other themes?”, and “What is the overall story related to my research questions the different themes reveal about the topic?” These sorts of questions guided my analysis further once a thematic map started to emerge.

The next phase involved refining the identified themes. I reviewed the coded data extracts for each theme to consider whether they formed a coherent pattern. I asked myself questions such as, “Do these themes reflect the meanings evident in the data set as a whole?” In due course, I became aware of some inadequacies in the initial coding and theme identification and adjusted accordingly. This included further modifications within and amongst themes. For instance, I inserted a new code if a relevant issue in the text was not covered by an existing code, and deleted an existing one if it was not needed or if it substantially overlapped with other codes. At times I had to refer back to the complete text so as to confirm that I had accurately captured the meaning when seen in the context of the whole response. I also occasionally listened again to the interview recordings; this had value, such as attending to the fine details of the conversation (for example, a giggle, emphasis in speech, a pause or a sigh) which I might not have captured in the verbatim transcripts.

I expected this need for modifications since analysis is an ongoing process. Through re-reading the text segments within the context of the codes under which they had been classified, this was an occasion for further data analysis. For example, ‘employing discussions’ was initially a main code relating to ‘powerful pedagogy’. I then decided to include it under the theme ‘adopting a variety of teaching strategies’ since I started to perceive it as an important aspect of infusing variety in the teaching and learning process. I also reduced data into a more manageable set of relevant themes that attained significance in forming a picture or narrating a story relating to powerful knowledge and pedagogy in economics education in Maltese secondary schools. I ensured that the data within the themes cohered together meaningfully, with a clear and identifiable distinction between the themes.

When I felt that I could clearly and succinctly describe the scope and content of each theme, then I started writing a narrative for each one, trying to identify the story that each theme revealed, while considering how each fitted into the overall story about the entire data set in relation to the research questions. I included direct quotes from the participants; these add life to the narrative, aid the reader to understand specific points of interpretation and demonstrate the story of the data and the prevalence of the themes. Where appropriate, I included more extensive passages of quotation to give the reader a flavour of the original texts. This last phase further continued to deepen my understanding of powerful knowledge and pedagogy in Maltese school economics.

6.9 Ethical considerations

During the course of my research, I followed the guidelines of the British Educational Research Association (2011). I conducted all research with the voluntary informed and written consent of all participants and organisations involved. The latter included the Malta Ministry for Education and Employment and the Secretariat for Maltese Catholic Education. Because I conducted the research in a country other than the university wherein I read the doctorate, I sought and obtained the approval of two institutional review boards, being the UCL Institute of Education and the University of Malta. In view of bilingualism in Malta, I presented all research instruments and related participation information and consent forms to participants in Maltese and English, as required by Maltese law.

I took the necessary steps to ensure that all participants understood the process in which they were going to be engaged, including why their participation was necessary, how it was to be used, and how and to whom it was going to be reported. Before interviewing the students, I sought their own consent and that of their parents/guardians, explaining the purpose of the study and providing my contact details in case they wished to discuss further.

I reminded the participants of their right to withdraw from the study at any time without explanation. Being aware that they might experience discomfort during the research process, I tried to put them at ease by attempting to carry out the interviews in a relaxed, informal style. Towards this end and in acknowledgement of bilingualism in Malta, participants chose whatever language they preferred for expressing themselves. I tried to be sensitive and minimise as much as possible the impact on the participants in terms of workload and time dedicated to the research. I did my best to treat the respondents' participation in research graciously and respectfully whilst remaining true to the research at hand.

I assured the participants of confidentiality and anonymity. For instance, I informed them how the data collected was to be stored, to what use it was being put, and to whom it would be made available. I stored all files electronically, anonymised all written and verbal evidence, and presented only relatively short extracts. I will destroy all data after three years of submission of this work. I was aware that the small-island context of Malta might make it hard to adequately hide the identity of the research participants and simultaneously provide the research audience with enough context detail to put the work in perspective.

6.10 Conclusion

This research study adopts an interpretative methodology with the underlying assumptions of a critical realist's epistemology and ontology. I collected data from interviews and lesson observations in an attempt to understand better powerful knowledge and pedagogy in secondary school economics education in Malta. My research attempts to shed light upon this unexplored area. The complex reality which I explored does not fit neatly into pre-established categories. Thus, whilst acknowledging my positionality, I question and reflect upon the 'reality' of what is

represented by the different interpretations and perspectives given by the teachers and the students.

The following two chapters explore the study's research questions by discussing what powerful knowledge in Maltese school economics looks like (chapter seven), and what pedagogical approaches promoted the students' engagement with disciplinary knowledge in economics (chapter eight).

7. Powerful Knowledge in Maltese School Economics

This chapter discusses how and in what ways economics learned in Maltese secondary schools empowered students with knowledge that took them beyond their everyday knowledge and experience. This discussion, which draws upon the voices of 14 teachers and 20 Year 11 students and 14 lesson observations, relates to the first research question of the thesis: How does economics offer secondary school students powerful knowledge that enables them to think beyond their everyday experience?

I argue in chapter five that there are two ways of perceiving powerful knowledge in school economics. The first type is discipline based, theoretical knowledge existing outside the direct experience of students which is acquired when they grasp economics threshold concepts. These concepts are discussed in section 7.1. The second way of perceiving powerful knowledge in school economics derives from the first type of powerful knowledge and provides students with the intellectual ability to analyse, explain, predict, evaluate and think about the economic world in ways that are beyond their personal experience. These types or expressions of powerful knowledge in Maltese secondary school economics are discussed in sections 7.2, 7.3 and 7.4.

7.1 Economics threshold concepts in Maltese school economics

My data from the teachers' and the students' interviews and my lesson observations refer to the notions of scarcity, choice, opportunity cost, marginality, demand and supply analysis, and market structures as concepts that might provide epistemic access to students. Teacher Robert argued that *"concepts in economics set the framework for the students to learn the economics content. They're the most important material that they should learn. Then everything makes sense."* This comment echoes the literature on threshold concepts (chapter four) describing these concepts as 'conceptual gateways' or 'portals' which open up a previously inaccessible way of thinking in the subject. In chapter five I argue that threshold concepts constitute powerful economics knowledge that has been developed by experts within an epistemic community (section 5.2.1). Grasping economics threshold concepts enables students to make the conceptual changes needed to adopt an economic way of thinking.

Most of the teachers interviewed emphasised the concept of opportunity cost; it is the consideration of the next best, rejected alternative when making choices. They suggested that students needed to first progress through the concepts of scarcity and choice to grasp the discipline-specific concept of opportunity cost. Scarcity means that the demand for a good or service is greater than the availability of that commodity, imposing choice upon economic agents. Teacher Franky maintained that scarcity and choice are *"important ideas that students need to learn before understanding opportunity cost. Economics exists because of scarcity due to limited resources. If resources were infinite, we wouldn't need to study choice … and economics."* He discussed how he felt the need to clarify the meaning of scarcity because some of his students would *"take it as something that they won't find in shops; if you find it in shops, then it's not scarce."* This illustrates how a concept intended to convey to novice students a new theoretical idea may have a different meaning in everyday usage, highlighting the relevance of exploring the students' perceptions of a concept before introducing them to the idea.

Some teachers attempted to persuade their students that scarcity is faced by everyone. For example, Liberata contended that for some of her students this was a new way of thinking because their families took care of most of their needs. I observed her emphasising with her young learners that everyone faces scarcity and choice:

> *A rich person might have to decide between buying a luxury car or a yacht. A poor person might have to decide between buying food or clothes. A business might have to choose between buying a machine or a piece of land. For the government it's more complex. … It may have to choose between building a new hospital or constructing more roads.*

It seems to me that in her attempt to facilitate her students' understanding, Liberata oversimplified the explanation. Choices at individual, business and government levels are not simple binaries but involve fundamental and complex choices. This is especially so where decisions at a government level are concerned. For example, the government might be faced with a macroeconomic choice of more government spending or lower taxation. By inviting them to consider the complexity of these decisions, students are empowered, for instance, to understand and participate better in political debates. It is this level of student understanding that would promote a Future 3 economics curriculum.

Concurring with the economics threshold concepts literature, the most emphasised threshold concept in my research data is opportunity cost. Teacher Grace argued that *"opportunity cost implies studying the best use of resources. Since students encounter it in most topics, it's important that they grasp it. Otherwise they can find difficulty in sustaining their progress in learning economics."* The majority of teachers contended that opportunity cost provided the students with an analytical tool for considering their own choices in terms of the value of the alternative courses of action. Whilst explaining the PPC, for example, I observed teacher Susan delving into a discussion with her students that every choice incurred an opportunity cost. Since most of her students played football, she brought an example of playing a football game during an intense examination period, and then failing the examination: *"Consequently, I suffered a high opportunity cost. I need to reap maximum benefit from my choice, but at the lowest opportunity cost."* I observed a student reflecting; a few moments later he remarked that *"in this case it was better to choose to study, because the other alternative cost more."* This episode exemplifies how relating to everyday experience facilitated the student's conceptual engagement with the discipline based knowledge involved as represented by the concept of opportunity cost. A facilitating factor in this regard was that the teacher knew her students' interests. Once students grasped the opportunity cost of choices that needed to be made at a personal level, Susan proceeded to discuss the alternatives incurred at a national level, such as the opportunity cost of building more roads across the Island. She told them: *"We've started from the PPC which is underpinned by opportunity cost. We're now using this knowledge to evaluate government policies, such as assessing the costs and benefits of certain policies vis-à-vis the environment and traffic."* During the interviews, one of Susan's students remarked how glad he was that now that he had learned about the concept of opportunity cost, he could make more informed life decisions: *"It's a concept that can be actually applied to oneself. It's relevant, so I enjoy more learning economics."* This can be considered as powerful in that the student was equipped with an analytical tool that could help him make more informed decisions as a consumer, citizen and worker. The threshold concept of opportunity cost cultivated the student's agency and his capability to think like an economist; these are aspects of an economics Future 3 curriculum which is characterised by the engagement with powerful knowledge. The aspect of opportunity cost as an analytical tool for secondary school students is discussed further in section 7.3.3.

Teachers described opportunity cost as the foundation of other concepts such as the production possibility frontier, marginality, demand and supply schedules, market structures, and comparative advantage. This finding resonates with Davies and Mangan (2007) who contend that opportunity cost might not be perceived as an independent entity but as nested within other concepts as part of a web of interconnected concepts. Although the concept was normally discussed at the beginning of the secondary school economics course, teachers attempted to refer to it when discussing the other topics. For example, Claire explained how she *"linked back"* to the concepts of scarcity, choice and opportunity cost. She argued that there was the tendency, for instance,

> *to consider the topic of 'economic systems' as a separate topic. I need to go back to scarcity and choice. … When I'm explaining international trade, I ask my students: 'Why can't we produce all the products that we want and need to import certain goods?' … Because of the scarcity of resources. We have to choose what to produce. … We need to link back.*

Claire attempted to remind her students that the concepts of scarcity and opportunity cost underpinned the economics knowledge they were learning. She contended that a grasp of these concepts was essential to *"avoid having a fragmented view of economics."* This quote suggests the integrating function of the threshold concept of opportunity cost, in that by grasping the concept what formerly appeared to students to be disparate elements are brought together into a coherent relationship, enabling a deeper understanding of the economic world.

The lesson observations suggest how four teachers emphasised the concept of marginality, that is, that economic decisions and behaviour occur in terms of incremental units, the focus being on evaluating how much, more or less, of an economic activity. This finding calls to mind the argument of Davies and Mangan (2007) who propose the concept of marginality as exhibiting the characteristics of threshold concepts. A number of students in these classes considered how marginality applied to the law of diminishing marginal returns, economies of scale and the derived demand for labour. For example, I observed teacher Monica discussing with her students how the concept of marginality underpinned the firm's decision relating to how many workers to employ. For instance, when explaining the graph illustrating the total, average and marginal products, she asked: *"Up to which point shall the firm continue employing workers?"* A student replied: *"We look at the marginal. ... Up to the*

point where marginal product becomes zero." The way another student Vince from Monica's class articulated it during the interview suggests that he was understanding the concept of the margin:

> *As a future entrepreneur, I may say to myself: 'Listen, I can employ this worker, but if I'm going to employ him, is he going to affect productivity?' … My printing firm, for example, employs five workers. If I introduce the sixth employee, there might be a drop in productivity. This consideration helps. It's a bit difficult, but it's important.*

These two examples from Monica's class suggest how easy it was to present economics as an amoral subject. This finding is in line with the literature discussing the tendency of presenting economics as if void of values (e.g., Brant, 2011; Spotton Visano, 2018, 2019), promoting a Future 1 economics curriculum. In this case, Monica was suggesting that human resources were something that could be disposed of, and that the firm lacked a long term perspective towards valuing its labour force such as failing to provide adequate working conditions that included long term job security, training, and health facilities. Monica and her student Vince were also not considering the complexity of the social world within which firms took their decisions. For instance, businesses cannot dismiss workers at will. They need to consider how the demand for their commodities might change in the future, have to abide by employment and labour laws, and need to consider how their decisions might affect their reputation in the market. As I have argued in chapter five, a Future 3 economics curriculum needs to empower students to perceive firms as conducting their economic behaviour whilst socially interacting with others and caring for them. This approach would assist the students to conceive in the discipline its moral and social purposes. After all, these were the sentiments of the early great economists. Adam Smith, for instance, maintained that persons possess a natural tendency not only to care for themselves but also for others, especially those in need (Smith, 1776).

Nine teachers and five students considered important an understanding of the notions of demand and supply and market structures. This finding is in line with the literature that identifies price formation through interaction between markets as a threshold concept. Teacher Grace maintained that when students grasped these concepts they understood better *"the market forces that they experience in their everyday lives, such as when buying their technology gadgets. They have the opportunity, for instance, to reflect how a firm establishes the price and its related revenue streams."* One of her students, Jake, remarked that *"if you don't grasp demand and supply, you haven't*

understood an important aspect of economics." He explained that since he was interested in buying a smartphone, an understanding of demand and supply provided with him insights about the market forces that influenced the price of the various brands of smartphones he was considering buying. One factor that he was reflecting upon was the level of competition between the various firms. By grasping the disciplinary knowledge relating to demand and supply and market structures, Jake was enabled to start to think in new ways about the market for smartphones, enabling him to eventually decide upon the best course of action to follow. These effects can be considered as powerful because the student is instigated to think in new ways.

Teachers contended that grasping the concepts of demand and supply and market structures was a prerequisite for understanding other economics topics such as inflation and the labour market. Teacher Robert claimed that

> *everything builds upon the ideas of demand and supply, even macroeconomics. When I explain inflation, I present the demand and supply in aggregate terms. … But it's the same idea. Why should a student experience demand pull and cost push inflation as difficult when she has understood the demand and supply of a commodity? ... They're the same thing but in different terms.*

Robert is suggesting that teachers need to invest enough time to ensure that their students experience a deep understanding of the threshold concepts involved before proceeding to discuss other ideas.

The identification of scarcity, choice, opportunity cost, marginality, demand and supply analysis, and market structures as concepts that students needed to grasp in order to progress in their learning is consonant with the threshold concepts literature. As discussed in section 5.2.1, these are concepts that meet the epistemic criteria established by powerful knowledge by enabling students access to critical ways of thinking about the economic world which transform their perceptions and behaviour. Whilst not being aware of the term threshold concept itself, the data suggest that teachers were conscious of the importance of grasping these concepts in terms of assisting their students to start thinking in the subject and become part of the community of thought that has developed the idea.

7.2 Knowledge that enables a deeper understanding of the economic world

A common theme emerging from the data is that economics facilitated 'an economic understanding of matters' (Jephcote, 2005). This is a form of powerful knowledge

advocated by the first expression of powerful knowledge discussed in chapter five: knowledge that matured students in economic literacy, being the ability to explore, understand and discuss events that occur in the economic environment. For example, teacher Mary argued that economics *"stretches the students' experience by assisting them to understand and make better sense of what's happening in the economic world around them. The subject matures students in the adult economic world. Because everything revolves around economics ultimately."* By assisting the students *"to read the economic world around them better"*, she argued that economics facilitated *"their following of the news about the economy, which they could understand better and enjoy more the subject. For instance, by applying the ideas of demand and supply students can acquire insights about why rents are increasing."* Concurring with two other teachers Liberata and Grace, Mary contended that this understanding of the real world was being missed by State school students who did not have the opportunity to learn economics. I observed two of her students remarking: *"Miss, we heard that the European Central Bank has lowered the interest rate."* Later on she explained to me that students often noted *"issues relating to the economy"*. She argued that they realised that what they were studying was happening. In this case of the lowering of the interest rate, I observed her trying to elicit from her students the possible implications on credit and investment, especially if the Maltese Central Bank followed suit. I also observed Mary's students reflecting upon the creation of money by the commercial banks and the causes of inflation. At one point during the lesson on inflation, she asked her students: *"What happens if the Central Bank prints money excessively?"* She attempted to involve them into a discussion exploring the effects of the increase in the money supply on economic activity, namely that the aggregate demand in the country might increase and, being at full employment, prices might increase too. Mary argued that the ideas about the interest rates and the money supply tended to be difficult for the students to grasp: *"Since the topic is quite detached from the students' experiences, I find it difficult to bring their daily experience in the discussion."* However, by being exposed to these ideas outside their immediacy, the students were provided with the opportunity to broaden their perspectives about the economic issues discussed. This opportunity enabled them with access to powerful knowledge, knowledge that they initially experienced as unfamiliar since they did not have access to it in their families and in their immediate surroundings.

Most of the interviewed students suggested that economics assisted them to make sense of the economic phenomena happening around them. Student Vince, for instance, considered that if he bought an ice-cream, someone was *"buying the ingredients, organising the factors of production, financing the machines, paying interest on the money borrowed to buy the equipment. ... It's all part of a complex process."* Learning economics assisted him to think beyond his simple act of buying an ice-cream into reflecting about issues relating to the existence of a market for the factors of production. Teacher Franky articulated this awareness cultivated by economics as *"maturing students into investigating and discussing economic issues, realising that the world is much more complex than they think."* Student Dassier argued that the reason why he had chosen to study economics was *"to understand better what's happening at the moment in markets and businesses, and what the government is implementing and why."* He described how learning economics enabled him *"to understand more the news, what's happening in the economy, understand better Brexit, countries applying for entry into the EU ..."* In this regard, he referred to economics as *"an actual and current subject."* In contrast, student Sven contended that some topics in economics were not relevant because *"they studied them in theory and did not occur in everyday life. They're just economic terms."* He referred to studying the free market economy, contending that *"this type of economic system cannot be seen."* While agreeing that there is no such scenario as a free market, teachers can develop an understanding of the invisible market forces in operation within markets characterised by levels of competition. A critical realist conceptualisation is useful here in that it assists the exploration of a reality that is layered and is not immediately perceivable but exists independently of our perceptions and where economic reality is understood in terms of the forces that act upon it. This conceptualisation enables a deeper and nuanced understanding of the economic ideas involved.

Students Dwayne, Reuben and Chris referred to economic models as an aid to understanding. For example, Dwayne discussed how the idea of a perfectly competitive market helped him to

> *understand how the various actors involved might behave. Some issues cannot be perceived easily. The model helps me to be aware that they exist. … The whole model might not happen in reality since there might be no such thing as perfect competition. … But it provides me with insights about the operation of the market*.

Since he wanted to buy a new tablet, he explained how this economic model enabled him to be aware of the factors that affected the price such as the level of competition in the market. Learning economics assisted him to apply the concept of a market. This is in line with student Kyle's argument that *"before learning economics, I didn't know how the price of a new product was set. For example, why some products are expensive and others are cheap. Economics helped me to understand more how the price is set."* Chris and Kyle also referred to understanding more how the price of shares is established. Chris discussed how he *"used to be curious about the Stock Exchange. … I used to say to myself: 'What are these prices?' Now I understand more what they are and how they're determined."* These findings suggest that economics was experienced as powerful in that it enhanced the students' economic literacy.

Four students explained how they enjoyed tasks that enabled them to research current economic affairs and recent statistics. Luke, for instance, reported his desire that they were provided with *"more local data about the economy that facilitated their understanding."* This is a recommendation for teachers to use more real-world economic data, a suggestion strongly endorsed by Piketty (2014). Economics becomes more contextualised in the local, national and international settings.

Students who followed the news facilitated their understanding of the subject. Teacher Monica noted that these would *"already have a package of economic ideas. They won't know them technically as I would be teaching them, but the basic knowledge would be there. The subject is all around us, it's happening, it's everyday experience."* I observed her encouraging her students to follow current affairs: *"You need to realise what's happening around you so that we bring these events into our discussions."* Five teachers mentioned that getting students motivated to learn about current affairs was the first step in the process of economic understanding. Liberata emphasised that students needed this impetus because they tended *"to live in their world of games. They might not be involved in buying what's needed at home and, at times, seem not to bother about what's happening around them."* During her lessons, she tried to intrigue them to learn about what was happening in the economy. Then *"they start discussing and giving value judgements about the news they hear. For example, I ask them: 'We're building all over Malta. What are the repercussions on the economy?'"* Liberata contended that it was important that students realised that *"there's an economic world out there. I tell them that we don't learn economics in a vacuum but*

within a context." She discussed that they gradually started *"to emerge from the bubble of their home or the game which they're playing. Economics gets them into the adult world. They grow aware, for instance, of the international trade problems faced by countries."* Mary used the term 'inquisitive' to refer to the attitude of being interested in real-world events:

> *Students who wish to learn economics are inquisitive ones who want to learn more by analysing what's happening around them. I do identify particular students in Year 9 and say to myself: 'These will be excellent economics students.' Because they're all the time asking and, very often, anticipating what's coming next.*

The approach of teachers discussing economic events from the real world positioned economics as embedded in an open social system as opposed to a closed one, contextualising the subject socially, historically and politically and in the local, national and international contexts. An understanding of economic events facilitated the students' encounter with economics knowledge that assisted them to move beyond their current knowledge. This echoes Bustin (2019) and Roberts (2014) who consider everyday experience in geography education "as an important resource for teachers to draw upon in the classroom, which should therefore be considered 'powerful'" (Bustin, 2019, p.176).

By reflecting upon what was happening in their students' lives and in the economic world around them, teachers tended to adopt an inductive approach that explored the invisible forces operating in the economic environment. For example, knowing that some of her students were interested in buying a laptop of a particular brand, I observed teacher Christy involving them into an exploration of the factors that affected their demand for this product. These included the price of the commodity itself, the consumers' income, the price of related goods, and the tastes and preferences of consumers. The teacher also referred to price elasticity of demand, that is, the consumer's responsiveness to a change in the price of the commodity. One student remarked that her demand for this particular laptop was inelastic – she was willing and able to buy it irrespective of the price. Teacher Christy similarly contended that her demand for fuel was perfectly inelastic: *"I buy it irrespective of any price changes."* This is understandable as an individual example: Christy needed her car for family errands around the Island. However, different consumers might respond differently. Some might demand less fuel when price rises considerably, possibly using alternative forms of transport such as public transport, cycling or not travelling at all, resorting to

online meetings from home. In fact the data for fuel prices in the United Kingdom suggest that when price was at a high level in 2013, tax revenues fell as demand declined, confirming an elastic demand for the market as a whole. Instead of evidencing by an anecdotal example, empirical evidence was needed to illustrate how changes in the price affect the demand for a commodity. This is in contrast to the deductive approach where teachers and students adhere to an economic model without exploring reality itself. The inductive approach which tended to be adopted by these teachers echoes Piketty (2014) who based economic understanding on making sense of empirical data rather on the typical apriory examples suggested by neoclassical economic models. Individual, local, national and international considerations need also to be kept in mind so that teachers challenge their students to think more broadly; economics then becomes more a tool that assists understanding. This is an important step towards the cultivation of a Future 3 curriculum.

The research data suggest that learning economics provided students with a distinctive way of perceiving the world through an economic lens. Student Vince discussed how learning economics helped him to consider that *"certain economic decisions had not happened by co-incidence but were influenced by some unseen forces."* This suggests that he was educated to explore the unseen forces and mechanisms at work when examining an economic phenomenon. Vince mentioned an example from the topic of location of industry: a weight gaining firm that locates near its customers. This is a business in which the final product weighs more or comprises a higher volume than the raw materials required to produce it. Vince illustrated by providing an example from the manufacture of machinery from steel; since the end product is bulkier than the raw materials, the firm attempts to locate near its customers to minimise transport costs. Learning economics provided him with insights about why weight-gaining firms located at one place and not another. This economics knowledge was powerful in that it assisted this student to understand and explain economic events that were beyond his personal knowledge and experience. It also enabled him to participate in discussions: *"It's not that people are discussing and I feel disconnected from the discussion. I would be aware of what's happening around me and try to make sense of it."* Another example of how economics deepened students' perspectives about economic issues was discussed by Kyle. He explained how

learning economics assisted him to comprehend better how the price of a commodity was determined, and the responsiveness of consumers' demand to price changes (price elasticity of demand). He experienced this knowledge particularly relevant because his parents managed a grocery shop. For instance, he was glad that now that he had learned about the price elasticity of demand, he *"grew sensitive to observe the consumers' responsiveness to lower their demand in response to the increasing prices of certain products in the shop."* The epistemic access gained by grasping economics knowledge seemed to provide Kyle with a broader and deeper perspective about economic issues. These examples suggest that economics assisted the students to grasp knowledge with which they were not familiar, and assisted them to develop an awareness of observing and analysing what was going on in the economic world around them. According to teachers Mary and Grace, the latter aspect constituted an important element of an educated person: *"I regard an educated individual as someone who knows how to interpret and analyse what's happening around him"* (Mary). This is a form of powerful knowledge that economics has to offer.

Teachers Robert and Antonia attempted to cultivate in their students an attitude of humility when studying economics in that they were trying to understand a glimpse of *"a vast economic reality"* (Antonia). For example, Robert maintained that economics helped his students to think beyond the *"face-value economic situation being considered."* This suggests the need for a critical realist conceptualisation underpinning economics that assists the exploration of a complex reality. Another issue that Antonia referred to was that students needed to learn *"that we're trying to explain reality by means of theories which in twenty years' time may be replaced. This is knowledge that may be in a state of flux – theories that can be potentially replaced."* This is a relevant aspect of economics knowledge in a Future 3 curriculum, which is in contrast to how economic theories in a Future 1 scenario are transmitted to students as a fixed canon of knowledge that must be assimilated as if truth itself.

The findings in this section suggest that economics enabled students with a deeper understanding of the economic world, thereby providing them with agency to make more informed choices as consumers, citizens and workers. This is a form of powerful knowledge that the discipline offered, assisting young people to cross new thresholds in terms of a more mature understanding of the world. It corresponds to the first type of knowledge discussed in section 5.2.2, being the economics knowledge that is

powerful because it provides students with a distinctive lens that assists a deeper understanding of economic phenomena or events, particularly those that are beyond their personal knowledge and experience.

7.3 Knowledge that equips students with new ways of economic thinking

This knowledge represents the second expression of what powerful knowledge in economics might look like as discussed in section 5.2.2. It is the knowledge that provides students with agency by enabling them with critical ways of analysing and explaining economic situations.

7.3.1 Knowledge that enables the analysis of economic situations

The data suggest that economics empowered students with critical ways of analysing, explaining and understanding economic situations. Teacher Robert argued that

> *economics provides students with a perspective of how to look at life, in a way that they start perceiving reality and situations from a certain economic perspective. Economics teaches students not just the content itself, but cultivates in them a way of how to be critical, how to analyse, and how to weigh the benefits and the costs, even in life decisions. That's I think is one of the biggest contributions of economics. … It gives them a way of thinking to be critical of life, and it's a strong tool for analysis of life in general.*

Robert emphasised that economics was not concerned about *"the acquisition of skills"*, which might nourish a Future 2 curriculum, but upon fostering a way of thinking. For example, I observed him discussing with his students that although opportunity cost is *"a simple concept learned at the beginning of an economics course, it's something that stays with the individual. It needs to be kept in mind when making personal decisions, such as whether buying a new car or a second-hand one."* He contended that *"someone who has learned economics can be identified from another who hasn't, because the way the person argues and perceives life is informed by his economics education."* Robert was suggesting that grasping disciplinary knowledge in economics brought about a transformation in a person's way of thinking, in that the individual starts to critically analyse economic situations and think in the subject. This is an important aspect of a Future 3 economics curriculum, and concurs with one of the aims of the proposed economics syllabus in Malta for 2025 being "the nurturing of the critical and independent mind, which is crucial in fostering a mentality that embraces change" (MATSEC 2024, n.d., p.2). In a similar vein teacher Mary maintained that

> *economics is a subject that provides students with analytical and investigative skills*

> *for critical thinking; students cannot take issues for granted. Once they study economics, they start viewing life from a different perspective. They start questioning and investigating issues, and learn to avoid sweeping statements. I try to question them all the time. They start to think and challenge themselves further.*

When teaching the topic of national income and discussing leakages and injections in the circular flow of income, I observed a student in Mary's class remarking that *"if injections are greater than withdrawals, then it's a better situation for the economy."* The teacher told him: *"Let's think a little bit. Can we always say it's better?"* A discussion ensued focused upon the words *"It depends … "*, which she wrote at the centre of the whiteboard. The argument discussed was that it depended upon whether the economy was experiencing inflation or unemployment. During the focus group interview, student Reuben explained how his teacher Mary educated them to explore an economics argument and *"not just reply by a 'yes' or 'no' answer"*. I observed that when a student answered one of her questions on national income, she asked: *"Raise your hands those who agree with this answer. Now group together, discuss why you agree, and write a statement. … Those who disagree. Group together. Discuss why you disagree and come up with the reasons."* I observed the discussion that was generated, with students challenging each other's ideas. These discussions were recalled during the interview with Mary's students; Reuben maintained that *"economics lessons became more interesting and engaging."* Students were provided with the opportunity to think about the feedback provided on their ideas from their peers and engage more with the economics knowledge involved. This teacher's effort was conducive for the students to start to think in the subject and like an economist and to develop a critical understanding of the world. These are key purposes of educating in economics which promote a Future 3 curriculum.

Student Peter discussed his urge *"of analysing and arguing about what's really happening and not just repeating what others such as politicians are saying."* This was why he had chosen economics:

> *I don't want to take things at face value, as they appear. I would like to delve and analyse deeper. For example, if there's unemployment, I want to analyse why it exists, what's causing it, and what policies the government may adopt to alleviate it.*

This attitude of exploring economic phenomena to identify the forces and mechanisms that are causing them is powerful in that the student could proceed from a level of

reality that he understands to the level of what explains the phenomena, which at any moment of time he might not be understanding them. The student would be applying economic concepts to analyse the workings of the economy. In this respect, students Peter, Dwayne and Chris contended that for a person to claim that *"he's good in economics, he must not only have knowledge of the subject, but is also able to apply that knowledge to reality by knowing how to analyse a situation"* (Chris). Dwayne, for instance, maintained that *"a good economics student could apply economic concepts to the running of a business. For example, his knowledge of the concept of opportunity cost assists him to consider the various options available when making business decisions."* When students apply disciplinary knowledge in economics, they start the process of thinking in the subject. This aspect of equipping students with new ways of economic thinking is a form of powerful knowledge that economics has to offer.

I observed some teachers encouraging their students to explore in a deeper way the forces at work in an economic situation, thus perceiving a level of nuance and detail in economics. During the lesson on money creation, for example, I observed teacher Mary inquiring whether 42% was considered adequate - this was the percentage of all deposits at a local bank that was loaned out during 2019. A student replied: *"It's good."* She urged him not to rush to a conclusion and analyse better the situation. Soon afterwards another student noted that that was *"a good amount because if something happens to the bank there are enough funds to back up."* Mary's aim was to educate her students into creating an argument to justify their opinion using economics as an analysis tool. In this case, her point was that one cannot definitively argue that 42% is adequate because it depends on various circumstances. However, she did not discuss that what might appear to be a healthy banking system might not be the case and could lead to a world crises as had happened in 2008. Students would have benefited if Mary had briefly mentioned this historical perspective and asked them to research about it. This perspective would better position economics, as argued, for instance, by Piketty (2014).

Teacher Grace was discussing an examination question when I noticed a student asking her for a model answer. She replied: *"A model answer? ... We discuss it in class, but I never give you a model answer. Do try to come up with your own response based upon the content that we've covered."* She appeared to be encouraging her students to start to think in the subject by instigating them to engage with the

economics knowledge involved. Other forces relating to a Future 1 curriculum were also in play. Some minutes later, I observed her attempting to get her students into thinking what the examiner was expecting. This was indicative of the challenge that the teacher was facing: on the one hand she was attempting to enact deep learning, and on the other hand there were expectations that she had to teach for the examination. This was accentuated because the school where Grace taught was expected more than others to deliver good examination results. It is ironic that when students are accompanied to think in the subject to foster deep understanding tends to produce higher grades than teaching to the examination.

7.3.2 Knowledge that empowers students to widen their economic perspective

The data sources suggest that when students embarked upon the process of thinking in the subject, they started to perceive issues from a wider perspective. This occurred, for instance, by instigating students to consider aspects relating to planning and decision-making. For example, student Dwayne argued about deciding *"not to buy something today because it's prudent to follow this course of action. I plan, be cautious and buy that commodity later."* Whilst arguing that students tended *"not to foresee the long term"*, he claimed that learning economics assisted him *"to visualise the long-term implications of actions."* This is powerful in that students could mature into more responsible consumers, citizens and workers. As an example, Dwayne referred to the government which *"spends money not only to satisfy the country's short term needs but also prioritises upon investing in capital that flourishes in the future, for the benefit of all, such as transport infrastructure."*

Teacher Antonia contended that economics broadened *"the students' economic awareness, particularly by perceiving issues through the pillars of households, firms and the government."* She exemplified by discussing the idea of a budget. She first explained the need of individuals and households to budget their income and expenditure, and then proceeded to discuss the need of firms and economies to budget their finances. She maintained that

> *economics helps the students to acquire a birds' eye view perspective rather than just focusing on one issue. They have the opportunity to see something from a wider rather from a narrow perspective. … How an issue might affect their parents, the business, the country, and the international community. They're not bound to just think how it will affect them only. I think they will be able to see it from a society perspective, so as to speak. Economics widens the students' horizons.*

I observed her exemplifying by discussing the situation when a person gets infected with a sexually transmitted disease:

> *First the government receives income from taxation from the message parlours. You know that there's currently a debate about these. … Then it realises that 500 persons are infected. What the government has earned as income from these parlours, has now to be redirected to the relative clinics as these offer their services free of charge. … Does this make economic sense? The economy is not generating resources. The government is simply redistributing taxation. I don't perceive intelligent sense in this.*

I observed Antonia emphasising during the discussion that *"our behaviour produces third party effects"*. This is in line with the data from the teachers' interviews that suggests that teachers educated their students into reflecting how their choices affected others. Teacher Liberata narrated how she educated them to grow out of their "*I don't care about what's happening around me"* attitude into an awareness that *"anything that happens affects all of us"*. She discussed, for instance, that if there was a market failure leading to an inefficient distribution of goods and services, it affected all members of society, especially the poorer ones. Liberata echoes Ian's argument who claims that economics cultivates a

> *macro perspective. Students learn to explore how their micro decision affects the macro aspect. For instance, they start asking: 'Are my current buying decisions affecting fair trade? How can these decisions improve the conditions of workers in other parts of the world?' If we can help our students to think in these directions, I think that the world can become a better place.*

Ian's argument ties in with the economics education literature that ethics and values do creep into economic arguments (section 2.1.6). The infusion of values such as love, honour, justice, and loyalty bring the subject to life, particularly because economics is inherently about values. Since Church schools are characterised by a strong moral ethos, the infusion of values assisted to avoid any tensions and conflicts that could have arisen if economics was taught as if void of values. The cultivation of this aspect of a Future 3 curriculum necessitates a move away from teaching a mechanical and amoral subject (a Future 1 approach) to one that is all about the world and how to make it a better place.

My research data therefore suggest that school economics tended to cultivate a form of reasoning that widened the students' economic perspectives, contributing to having more thoughtful citizens (and *"more intelligent tax payers"*) who could understand better how their actions affected others and the economy (Antonia). These are effects

that can be considered powerful in that the students could start to think in ways that were not accessible before they started learning economics. Another empowering effect that can be enjoyed by students when studying economics is the consideration of the alternative courses of action available when making choices. This aspect is discussed in the next section.

7.3.3 Knowledge that assists the analysis of the various courses of action

The teachers' voices and the observations suggest that teachers educated their students into considering alternatives when making choices. For example, teacher Robert claimed that students could *"use their economic thinking guided by the basic concepts in economics for their day-to-day decisions, assisting them to weigh the benefits and the costs involved."*

Most teachers mentioned that the concept of opportunity cost assisted their students to reflect upon the best course of action to follow. Antonia maintained that some students needed *"to be shaken into the notion of opportunity cost because, being relatively well off, they tend to get whatever they want, thinking that there's no cost involved."* For instance, they needed to learn to distinguish between a need and a want, because *"for some of them everything is a need, even a want."* She contended that through the concept of opportunity cost, economics assisted her students' consideration of *"the other possibilities of time and resources foregone when making choices."* This is a form of powerful knowledge that economics has to offer, especially to young people who are accustomed into getting from their families whatever they ask for.

The concept of opportunity cost assisted the students to reflect that their decisions affected others. For example, teachers helped them consider that when they bought something, they were depriving someone else of its enjoyment. Liberata argued that students tended to think that whatever they did affected only themselves: *"Sometimes, at this age, students don't see the bigger picture. I've to lead them to it."* She educated them into thinking that anything that happened affected also the other members of society: *"The idea of a social cost is an important aspect that they need to start considering."* I observed her discussing the example of someone who got involved in a car accident because of excessive drinking. This person created repercussion effects on others through the traffic congestion created and the pressure on the health

service. A consideration of how individual choices affected others was empowering in that students developed their ways of thinking. This consideration promoted a Future 3 economics curriculum in that students were enabled to challenge the notion of homo economicus who is regarded to follow his self-interest. This cultivation of aspects of a Future 3 curriculum assisted the students to perceive economics as a discipline enriched with values, and provided them with the opportunity to make sense of the economic world in terms of a values framework. Teacher Carmen articulated the argument in this manner: *"By studying the subject students grow aware of economics in social and value terms. The subject provides them with a more holistic perspective of the world by providing them with insights about notions which operate in society."*

Teachers further educated that there was no such thing as a 'free' good. Franky remarked that *"economics has this aspect of bringing up arguments that kind of look silly. Like, for example, buying air."* I observed him discussing with his students that fresh air *"is usually taken for granted, but we would have to pay for it if we went underwater. We would have to pay, for example, to hire the scuba equipment."* Another anecdote I observed was when a student told teacher Claire that they were now going to have free transport to school. She replied: *"Free? Who's going to pay for it?"* She discussed with them how everyone was contributing through taxation, and how these funds could be allocated to alternative uses. These examples suggest that the students benefit when they reflect upon the considerations arising from the concept of opportunity cost and the idea of free goods. The benefits reaped can be considered powerful in that young people are provided with the opportunity to develop their thinking and cultivate more responsible behaviour.

7.3.4 Knowledge relating to wider curricular themes

A common view emerges from my research data that teachers educated their students in the cross curricular themes of education for creativity, entrepreneurship, financial literacy and citizenship education. Teacher Ian argued that *"if one is passionate about these themes, by thinking creatively, he can create an aspect in every lesson."* He reported his attempts at delivering short messages across lessons: *"Not everyone digests the message in one lesson. But if you include these frequently, students are somehow going to take in these ideas."*

Learning economics facilitated citizenship education. Now that Maltese sixteen-year-old persons could vote in national elections, teachers Franky, Debbie, Stephen and Antonia maintained that economics was more relevant for secondary school students in their capacity as citizens and potential voters. Antonia voiced her concern about those students who did not study economics and were about to vote: their perspectives on the issues involved were *"not enlightened by the study of economics."* She argued, for instance, that they might not reflect who is paying for the repercussions of their actions. For instance, *"while they may vandalise parts of a public garden, they might not be considering that the repairs are going to be paid out of their parents' taxes. This money could go for alternative use such as for upgrading the education facilities which they're currently enjoying."*

Secondary school economics enabled the students as citizens to understand better what was happening in their country and be critical about these events. Teacher Debbie reported that they could ask, for instance: *"Shall Malta spend so many millions of euro to construct the tunnel between Malta and Gozo or channel these funds to upgrade the environment?"* Students also reflected about their 'critical supply', a term used by Antonia to urge them into choosing employers who provided them with the best pay and working conditions: *"Listen, I don't need to give my effort to everybody. I choose the best employers who provide me with the best conditions."* I observed her explaining to her students how economics prepared them for jobs in the economic and financial environment. Students were set thinking about aspects of their future employment.

A relevant aspect of citizenship education as taught through school economics is that students learned to evaluate the economic claims of politicians (discussed further in section 7.4.3). This is empowering in that the students were provided with the opportunity to realise that policy-makers and politicians did not have a monopoly on the truth, and as potential citizens and voters they had the right to develop their own thinking and criticise economic matters. Teacher Mary argued that if more students studied economics *"we would have much more active citizenship and less people following a party blindly."* Debbie emphasised that *"we cannot expect students to go out in the world and become active citizens if during lessons they're passive students. We need to actively involve them during lessons."* By empowering them to participate in discussions, economics education prepared students to mature into active citizens

who could contribute to a better world economic organisation. Economics cultivated *"the reasoning that helps in having more intelligent citizens who can appreciate better certain issues such as the value of housework, free rider issues, and the economic implications of people evading taxes"* (Debbie). Economic literacy is a form of powerful knowledge emerging from economics that contributed to an active economic citizenship that enabled young people to consider alternative perspectives, be aware of the implications of one choice over another, and the impacts of decisions on persons, society, the economy and the environment.

Entrepreneurship is included in the Maltese secondary school economics syllabus as one of the factors of production. The data suggest that economics empowered students with knowledge that might support their potential entrepreneurial initiatives. Student Peter argued that economics *"enlightens and provides ideas about how to go for entrepreneurship."* His teacher Stephen claimed that students studying economics were enabled to cultivate a way of thinking which was different from that of other students who did not study the subject in that the economics knowledge enabled them to be knowledgeable about entrepreneurial initiatives. This knowledge is powerful in that it provided young people with critical ways to analyse, explain and understand entrepreneurial situations. For example, referring to an activity where students managed the school canteen, Stephen maintained that economics students

> *understand better than the other students who don't study economics what is going on in terms of business activity. Other students have a steeper learning curve in entrepreneurship. Economics students become aware of the advantages and disadvantages involved, and are enabled to analyse the business situation well.*

This empowerment to think in an entrepreneurial manner occurred through the topics discussed. These included the role of the entrepreneur, types of business organisations, the price mechanism, costs, market structures, labour market, production, diminishing returns, location of industry, finance, international trade and population. This knowledge assisted the students as potential entrepreneurs by widening their perspective to understand better the business environment, such as comprehending how prices are determined, the factors which influence the decision where to site one's own enterprise, and the application of microeconomic concepts such as efficiency and the law of diminishing returns. Through their efforts at educating in entrepreneurship, these teachers were providing their students with knowledge that was powerful in that it moved them beyond their current entrepreneurial knowledge

and experiences. They were addressing the cross curricular theme of 'education for entrepreneurship' which is embedded in the Maltese national curriculum (Ministry of Education and Employment, 2012).

Students discussed that the economics knowledge acquired could assist them in managing their own business. For example, Luke claimed that the subject helped him to analyse the business situation better: *"I would know, for example, how I can make more profit, and how to expand and take the right decisions for the prosperity of my firm. Economics cultivates in me aspects of decision-making."* Alex, who aspired to become a commercial lawyer, contended that economics would come in useful in his future professional life to understand the issues and the challenges faced by firms whilst providing him with insights how to contribute towards the flourishing of his family's business: *"Before choosing economics, I said to myself: 'If I understand the subject, I can expand our family business.'"* He contended that *"an important skill for entrepreneurship which is learned in economics is that of evaluating all the options available"* by employing the concept of opportunity cost. He argued that teachers needed to encourage their students to evaluate their decisions by providing them with various examples and business situations. This approach would help the students to cultivate the skill of *"taking the best decision by evaluating how their particular action is going to miss out the other opportunities."* Alex's argument suggests how disciplinary knowledge in economics, in this case the concept of opportunity cost, could empower students to mature in their entrepreneurial thinking.

A common perspective suggested by the data was that school economics assisted the students to mature in financial literacy. Teacher Mary maintained that in most topics there were aspects which she could discuss to enhance her students' financial literacy. Three other teachers noted that since most students eventually worked in a business environment, economics students would be in a better position to understand the financial issues involved. Knowledge identified by teachers as relevant to financial literacy included learning to distinguish between a need and a want, opportunity cost, the way the market operates, how prices are established, the sources of finance available to businesses, money and banking services. This knowledge constitutes powerful knowledge in financial literacy by enabling the students to think and act in new ways in the financial field. Such knowledge is specialised knowledge because it has been developed within the economics community. Student Isaac argued how

economics *"sheds light upon managing my future financial affairs. I'm learning more about money, banking and shareholding."* Two students, Nicolai and Peter, discussed how economics helped them to keep abreast with and understand the financial news. This knowledge helped Nicolai, who was interested in shares, to know where the best investment in shares would be when in the future he managed to save *"some extra money."* These findings about economics empowering students with knowledge about the financial world suggest that learning economics provided young people with financial knowledge that they did not have access to at home and in their own communities. This resonates with the literature that economics education assists students into developing financial literacy (section 2.4.7). It is powerful financial knowledge that provides them with a sense of agency by helping them to understand better the financial world around them, to envisage alternatives in financial matters, and to guide their financial life paths.

In line with the relevant literature (e.g., Brant, 2018; Davies, 2015; Mallia, 2015; Mizzi, 2021c), these teachers did attempt to extend their students' thinking by considering aspects of critical financial literacy. This included an exploration of such questions as "To whose benefit is the system operating?", and being critical about the services offered by financial institutions and about their motivation when they attempt to educate the general public in financial literacy. Davies (2015) warns that situations "where students' knowledge of the banking sector is largely dependent on the story that sector chooses to tell about itself does not look very healthy for democracy" (p.310). These teachers attempted to educate for this healthier aspect of democracy.

Four teachers discussed that by adopting student-centred teaching approaches, economics assisted the development of the creativity potential of their students. Ian remarked that *"if we keep the subject teacher-centred, we're not providing our students with the opportunity to read around them, to be creative, and to develop research skills."* I observed Ian urging his students to be innovative in a coursework task that the students were assigned. This related to the topic of the types of business organisations. He urged them: *"Research your neighbourhood, identify the types of firms in your locality, and interview the entrepreneurs and some clients. Do create your own diagrams and sketches, and interpret your data creatively."* This approach provided the students with the opportunity to explore in a critical manner the business world around them.

Economics knowledge was powerful in that it assisted to clarify and deepen the students' understanding about the cross curricular themes of education for creativity, entrepreneurship, financial literacy and citizenship education. This knowledge had the potential to empower young people with a sense of agency when participating in society as consumers, workers and citizens. By enabling them to consider matters from a range of perspectives, economics teaching and learning followed the healthy direction suggested by the literature in empowering the students to perceive economics as not closed in upon itself but as reaching out to other areas (discussed in section 2.4.2), in due process enriching itself and becoming more relevant to students.

7.4 Knowledge that develops students' criticality of thought in economic issues and their participation in economic debates

This knowledge represents the third expression of what powerful knowledge in economics might look like (discussed in section 5.2.2). It is the knowledge that enables the students to grow aware of and criticise the state of affairs of economics education dominated by the neoclassical economics orthodoxy. Students are enabled to criticise the economics content proposed to them, critically consider different schools of economic thought, and participate in discussions over a range of perspectives on the economy.

7.4.1 The grip of the neoclassical school of economic thought

My research data suggest that there was an implicit acceptance of theory from the dominant neoclassical school of economics. For example, teacher Antonia maintained that the 'ceteris paribus' condition *"makes economics a science. It's like going to a doctor who eliminates one factor at a time. I like this condition."* Ceteris paribus is a Latin phrase that generally means 'all other things being equal.' It acts as an indication of the effect one economic variable may have on another, provided all other variables remain constant. By considering one factor at a time, Antonia argued that students could reason *"scientifically, taking into consideration one variable at a time.*" She brought an example from teaching the theory of demand: *"First we deal with price vis-à-vis demand, nothing else changes. If we add something else, we will get a complicated quadratic equation. I tell my students: 'Hold your horses!'"* By adopting this positivistic approach, she assumed that persons were behaving rationally.

However, results could turn out to be far from what were expected. She was in fact aware that some students could not digest the logic as proposed by the ceteris paribus condition: *"They have other types of logic, but not that. So we tend to classify them as failures, which isn't the case. They simply cannot take in this reasoning."* For instance, if they wanted to buy a pair of jeans of a certain brand, they would be interested in other factors other than the price, such as the style and the advertisements they saw. A student emphasised to her: *"I don't take decisions one factor at a time. I take my decisions based on three factors at a time, such as by considering the fashion, the price and what my preferred artist is choosing."* Antonia argued that since the demand and supply model is two-dimensional following the ceteris paribus condition, some students could not *"take this type of logic"* and *"just stick to their own mental mould and argue: 'I'm used to buying things in this manner, having three variables.'"* Antonia replied: *"Ok, but you cannot apply this logic to the simple Year 9 economics model."* It was Antonia's argument that some students, *"irrespective of their efforts and the brilliant teachers they might have, are simply blocked off economics."* This example is consistent with the literature that by closely following a neoclassical model, teachers could exclude aspects of reality which are important to understanding what is happening (Brant and Panjwani, 2015; Chang, 2011, 2014; Lawson, 1997; Skidelsky, 2020). A strict adherence to static neoclassical models as in a Future 1 curriculum might preclude a fuller understanding of reality, rendering economics learning dull and discouraging students from studying the discipline. This issue needs to be explicitly raised in teacher education and professional development programmes.

Another example comes from Susan's classroom when she was discussing the PPC. I observed her emphasising that, underpinned by the concepts of scarcity and the opportunity costs of choices, this model illustrates the possibility of producing two commodities, in this case armaments vis-à-vis food. She discussed efficient combinations of production on the PPC, inefficient ones inside the curve, and points outside the curve which are unattainable in the short run. She then consolidated this knowledge by working examination questions with her students. She followed a similar pattern: theoretical models were presented and the students' understanding was tested. This approach suggests an adherence to a Future 1 curriculum where students are led to accept static neoclassical theory, in this case assuming an economy consisting of two goods without a time dimension. Rather than risking perceiving the

PPC model as an entity in itself, students needed to perceive it as an explanatory tool that assisted their understanding of the unseen forces and mechanisms at work.

Another situation I observed where the dominance of neoclassical content was not challenged was when teacher Grace was discussing the demand and supply model. She presented this model and attempted to enact a discussion about it. For instance, she referred to a situation where the price level was below the equilibrium price. She attempted to involve her students by asking: *"What does this mean in reality?"* Student Sven argued that in this situation *"some human wants aren't satisfied."* I observed that attempts to challenge the ubiquity of the market and the dominance of the neoclassical content involved were limited. The teacher did not emphasise that the market mechanism is a tool to help the students explore the hidden forces of demand and supply.

The findings in this section suggest the relevance of assisting teachers to consider whether, unknowingly, they may be steeped in the dominant neoclassical school of economics and expecting their students to accept economics knowledge as given, thus nourishing a Future 1 curriculum. Their enactment of pedagogy, discussed in the next chapter, did however include approaches of cultivating an engagement with the economics knowledge involved. This engagement with knowledge promotes a Future 3 curriculum.

Nothwithstanding the lack of awareness in Maltese economics education of the dominance of the neoclassical economics orthodoxy, the data sources suggest that school economics did facilitate the students' participation in discussions over a range of perspectives on the economy, assisting them to recognise the political and economic nature of issues in economics. This is another aspect of the third expression of powerful knowledge in economics, discussed in the next section.

7.4.2 Knowledge that facilitates students' participation in economic debates

The data suggest that by educating the students into new ways of economic thinking (section 7.3), school economics cultivated in them an attitude of critically discussing economic issues. For example, students Nicolai and Jack contended that economics enabled them to discuss current affairs by employing the economic concepts they had learned. For instance, I observed them attempting to discuss what happens to the price when there was a bumper crop of tomatoes. Their teacher, Grace, claimed that

the analytical skills provided by economics enabled the students *"to arrive at their own conclusions."* I observed her asking them: *"Does it always make sense for the State to privatise an organisation owned by the government?"* In the discussion that followed, she urged her students to consider the type of product produced, whether it was a necessity or a luxury, and whether the privatisation could create a monopoly. She urged them to *"not just to know the content, but also to analyse it, arrive at one's own conclusion, and to argue about it."* This is an aspect of the third expression of powerful knowledge discussed in chapter five: knowledge that enhances the students' criticality of thought in arguing about economic issues. Teacher Stephen maintained that this was a contribution of school economics:

> *Students who study economics tend to stand up and discuss with their peers more than the other students who do not study economics. Economics provides students with a good base to discuss anything in life. Because if you know concepts like scarcity and opportunity cost, you can support your understanding and the points you're trying to make. Your statements are not just opinions, but are backed up by economic concepts. Through the economic concepts, you can then also evaluate the arguments of others.*

Stephen educated his students that *"any discussion point is valuable as long as it's backed up."* Concurring with teacher Christy, he noted that budget time provided an excellent opportunity for his students to enact a discussion by applying the economic concepts that they had learned. For instance, he encouraged his students to discuss the effects of the measures of the budget and the policies of the political parties, urging them to support their arguments with concepts from economics. He emphasised with them that *"unless you back up what you're arguing, there's no value in your argument."*

It was not easy for teachers to involve their students into discussing economic ideas. For example, I observed teacher Caroline asking her students about the advantages of being a sole trader. A student replied that one of the benefits was flexibility. She attempted to involve the others by asking them: *"Do you agree with her?"* Her aim seemed to be to create a debate about the benefits of sole ownership enjoyed by the owner and consumers. However, the students were not challenged to think about the benefits to society at large. They could have also been sensitised into considering the challenges the sole trader faces in the reality of a neoliberal market environment. These include having to pay high rents for premises whilst making modest returns and working long hours. Within neoclassical economics, returns derived from 'entrepreneurship' and 'land' are conflated, but a classical economics lens contrasts

the reward for entrepreneurship with the rentiers (land owners) who receive returns for no entrepreneurial endeavour and thus putting a spotlight on high rents that may act as a disincentive to risk-taking.

Teacher Christy suggested that participating in economic debates involved a gradual, maturing process: *"Some students tend to perceive issues as all black, others as all white. Economics matures them to argue from an economic perspective, discussing and investigating issues that are happening around them."* In a similar vein, I observed teacher Grace being adamant about not accepting a 'Yes' or 'No' answer as a response to her questions. She emphasised: *"You need to provide a reason for your answer when discussing an issue. Answering with a 'Yes' or 'No' limits your level of argumentation."* For example, when asking: *"Does it always make sense for the government to increase aggregate demand to control unemployment?"*, students were encouraged to delve into a discussion that first explored the types of unemployment that the economy was experiencing. She used the phrase *"It depends ..."* to instigate her students into evaluating the alternatives involved depending on the type of unemployment that prevailed. This teacher's efforts assisted her students to keep in mind that when devising an economic argument any course of action was contingent on the factors involved in the situation under consideration. Students were provided with the opportunity to analyse an economic situation and argue about it, with the possibility of becoming participants in their own learning. This is an expression of powerful knowledge arising from learning disciplinary knowledge in economics.

Whilst arguing that *"the focus should be on teaching the students the main concepts and the main way of arguing"*, Robert voiced a concern that hindered students from learning how to develop an argument: *"Unfortunately I think that school economics is too much based on studying content by heart."* Other teachers also echoed this concern. This is an effect resulting from the emphasis that the summative economics assessments were given, especially the SEC examination at the end of the economics course. The pressure of studying the economics content by heart was also discussed by students, especially in situations where their English language proficiency skills were lacking. Reuben, for instance, reported that *"for the examinations there's the terminology that we need to know and which we end up learning by heart especially if we're weak in English."* Chris reported this as *"parrot-like"*, consisting of studying facts by heart without experiencing deep learning. This focus on examinations tends to

promote a Future 1 economics curriculum characterised by the passive transmission of neoclassical economics knowledge, teaching to the examination, and the memorisation of content that may lead to shallow learning. Students may experience a limited or superficial understanding of the economics threshold concepts to be learned while going through liminality. I perceive them as having "encountered a threshold concept that they have not managed to breach" to start thinking in the discipline and to evaluate the economic claims of policy-makers and politicians (Meyer and Land, 2006, p.xi). The latter aspect is discussed in the next section.

7.4.3 Knowledge that enables the critique of the economic claims of politicians

Five teachers discussed educating their students into evaluating the economic news *"in an objective manner, irrespective of their political stance"* (Liberata). Stephen narrated how two Year 11 students coming from two different political family backgrounds discussed the election manifesto of the other party *"with an open view."* This discussion was characterised *"by a sense of tolerance and open mindedness. It has been very encouraging, since I've been educating my students in these attitudes during our class discussions."* He attempted to help them *"move out of their political colour, being able to come from the household of one political party and create an argument against that party."* In a similar vein, I observed Liberata telling her students that she did not *"want parrots in the classroom, that you learn notes by heart and that's it. You need to be able to criticise the policies of the present and previous governments in an objective manner."* This is an aspect of the third expression of powerful knowledge that I propose in chapter five: knowledge that encourages students to participate in debates that evaluate the economic decisions of policy-makers and politicians.

Teachers discussed how economics provided their students with the analytical tools to evaluate the economic statements of politicians. For example, Mary urged her students *"not to remain a puppet on a string. Do evaluate who's saying the truth. Don't just take their claims for granted because someone important is saying it, as if it's the truth."* Students were encouraged to be independent thinkers by being critical of the opinions of others including those of people in authority positions. I observed her exemplifying by politicians who quoted increases in the money GDP instead of the real GDP:

A politician is arguing that GDP went up by 10%. We need to evaluate what this person is saying and try to see what the facts are. Money GDP did increase by 10%; it's not a lie. However, when we take away the increase in prices, GDP went up by 2%. He's arguing a half truth. So we need to know what this politician is saying, and well, if he's being honest, or just using numbers for his or her political agenda.

Students who grasped the idea of national income could start to evaluate the statements about GDP. This is a form of powerful knowledge that the subject has to offer to young people. It is the knowledge that enables students to evaluate statistics instead of accepting them impulsively, detect faulty arguments or propaganda, voice their opinion, and criticise economic policy. Students could mature in their ability to make informed choices as citizens and potential voters. These are outcomes that can be considered as powerful.

Teacher Grace reported her students telling her: *"Listen Miss, yesterday that person said this."* They would know that the person made that claim *"for political reasons. It becomes part of them, especially the Year 11s. They learn the method of evaluating what they hear."* Grace concurred with Mary about urging young people to evaluate the statements of politicians because *"sometimes political leaders chose that part of the statistic that's most appealing to them"* (Grace). In this respect, Mary maintained that every student should have the opportunity to study economics; *"it's a pity that it's not offerred in State schools."* School economics tended to empower students to think about and evaluate the economic arguments presented to them. They were provided with the opportunity to acquire a sense of agency by seeking to find out what was really occurring in the economy, and critically judging issues and statistics by applying concepts from economics. These are relevant aspects of a Future 3 economics curriculum.

7.5 The risk of economics becoming 'a subject of the past'

Four students from Franky's class discussed that economics needed to address actual and relevant issues rather than be over-theoretical as at present, otherwise it risked becoming irrelevant to students. Alex explained that they had discussed at length the role of goldsmiths in the creation of money*:*

In our lessons we've talked more about goldsmiths of 2000 years ago then about Brexit and Bitcoin, for example. These examples about goldsmiths are boring me. I've never met a person who discusses goldsmiths. It's history. Passé. No more relevant. Issues that are important are those relating to bitcoin, cryptocurrencies, and the gaming industry.

Three other students in the focus group agreed with Alex. What they had expressed suggests that they had experienced a Future 1 curriculum where the content learned was not relevant to their experiences. To experience capability, for example, they needed to understand the applicability of credit creation, the relevance of Bitcoin and Brexit, and the factors that affected fluctuations in the euro and the pound sterling.

Alex explained how he tried to keep abreast with current affairs by daily following the news. However, he claimed that economics was not assisting him to grow in this aspect because *"unfortunately it's all passé! It's dying, becoming a subject of the past. This puts me off."* It seems that the curriculum he experienced was under-socialised, characterised by a given fact-delivery conception of teaching and learning. Alex maintained that in social studies they discussed much more current affairs such as Malta's membership in the European Union, the conflict in Libya, and the Brexit situation: *"I wish that in economics we do the same. ... For example, why aren't we studying the factors that are influencing the soaring prices in the property market?"* Nicolai was frustrated that during the economics lessons the 2008 economic collapse was not discussed: *"For example, if we're going to become entrepreneurs, how're we going to strive to avoid a similar collapse? I think that these discussions are relevant."* Alex speculated that the decline in the number of students studying economics at his school might be due to the fact that *"it's not a current subject. There's the need to revive it. If the syllabus is not going to become more related to current affairs, less students are going to choose it."* Alex's argument echoes Fine's (2010) recommendation to avoid dead and irrelevant content and examples in the curriculum, thus keeping the discipline alive and interesting to current and prospective students. This is an important move towards establishing a Future 3 economics curriculum characterised by the active engagement with the subject's key ideas. Alex further explained how awkward he felt discussing current issues when the occasion arose during family gatherings:

> *I am with my cousins. … They start discussing issues such as cryptocurrencies and bitcoin. One of them is a lawyer working on bitcoin. … I start becoming uncomfortable. I don't utter a word. Because I don't know about these matters and about what's happening at the moment, and so I find it difficult to include it in my arguments. ... An economics student who doesn't know what bitcoin is! A disaster.*

This cautions against adopting a Future 1 approach to teach economics which may render the subject irrelevant to students and provide them with little or no agency. The

question that arises is: What are the pedagogies that provide students with a meaningful engagement with disciplinary knowledge in economics and that promote a Future 3 curriculum? This discussion is carried out in the next chapter.

8. Powerful Pedagogy in Maltese School Economics

What pedagogical approaches promoted the engagement of students with powerful disciplinary knowledge in economics in Maltese secondary school classrooms? In this chapter, I explore this second research question of my study relating to powerful pedagogy by presenting the main themes identified in my research data. I draw upon the voices of the 14 teachers and 20 Year 11 students whom I interviewed, together with 14 lesson observations. Pseudonyms are used.

8.1 Connecting school economics to real life

A main challenge perceived by most teachers was how to engage young people with economic concepts. A useful pedagogical approach suggested by the data was to explore examples from daily life and gradually accompany the students into a deeper understanding of the concepts involved. Teacher Mary referred to *"building up"* and Stephen talked about *"bringing into the discussion the assimilation of real-life experiences."* Christy and Antonia were against economics being taught *"just dishing out the information without discussing it through relevant examples"* (Christy). This pedagogical approach suggests a move away from a Future 1 curriculum which is associated with a one-way transmission pedagogy to an attempt at assisting the students to engage with the disciplinary economics knowledge involved.

The data indicate that teachers used examples from their own life, their students' experience, and the world around them. Teacher Monica, for example, argued that once she provided her students *"with examples from real life, they easily understand. It makes all the difference."* This calls to mind the response of her student Vince when I inquired what was the necessary ingredient to grasp a topic: *"Relevant examples!"* Teacher Christy discussed her efforts to explain the content involved by

> *bringing examples from my life and my students' life that facilitate their understanding. ... At the beginning of Year 9, students tend to experience economics as too abstract since they're very young. But they get hooked up when I provide relevant examples and associate the topic with something which they've themselves experienced.*

This approach of exploring real-life examples is consistent with Kolb's (1984) learning cycle of starting off from what is familiar and concrete and proceeding to assimilate abstract concepts. Teachers attempted to identify their students' experiences which were relevant to the topic under consideration. This echoes Chang's (2011) assertion

that “the best way to learn economic principles is by using them to understand problems that interest the reader the most” (p.xviii).

Five experienced teachers discussed that before discussing examples related to businesses and to the economy, they first discussed examples from their students’ or family life. For instance, when discussing diminishing returns to scale, Mary urged her students to bring an example from home. A student recounted an experience when his mother was sick:

> *One fine day some relatives came to assist by cleaning the house. The cleaning equipment was however limited. … There was fixed capital in terms of the equipment, but labour was increasing. Individuals started going around the house and asking for the cleaning utensils. They started to bump into each other. … The situation became unsustainable. Diminishing returns set in. … This example helped my students to delve into this notion. … If I started from the economy it could become too abstract for my students to grasp. I need to start from the family - thinking how a concept applies to individuals, to firms, to businesses, and then to the whole economy.*

The challenge and invitation that Mary presented to her students was to think how school economics connected to their everyday life. She attempted to provide them *“with enough space to express themselves because there’s always something they know since economics is related to real life. Since students do experience economics at home, I build upon these experiences, and they understand more.”* In a similar vein, Antonia maintained that teachers needed *“to go into a deeper acceptance of any type of student knowledge and experiences and bring these into the lessons.”* She discussed that students had different *“economic and cultural capital”*, with some possessing more economic knowledge and experiences than others, particularly through their interaction with their parents who worked in the economic and financial sectors. The pedagogical approach of bringing in the students’ everyday experiences as a valuable resource facilitated their encounter and engagement with the disciplinary knowledge involved by contextualising economics in their daily life and inviting them to be aware of the economics that is wrapped up in their daily experiences.

While providing these examples, teachers attempted to instil in their students the ability to perceive *“the economics around them”* (Stephen). Christy emphasised with her students: *“You live economics! You cannot learn economics unless you feel that you’re living it.”* She claimed that pedagogy cannot oversee this aspect, especially since both teachers and students were *“wading in the same waters of economic*

structures and experiences surrounding us. So I start from there." Another teacher, Antonia, argued that by excluding real-life examples *"I will be removing the flavour and the enthusiasm from the subject. For example, how can I teach demand and supply by excluding examples relating to the shops my students buy from?"* By feeling responsible to *"keep the subject alive",* she felt the *"need to present it as part of real life, especially by bringing examples that students experience."* This is an important aspect of powerful pedagogy in economics: valuing and making use of everyday knowledge and experience. This concurs with Roberts (2014) who argues about the need for a school subject to draw on ways in which a discipline uses everyday knowledge.

The pedagogical approach of discussing real-life experiences constitutes powerful pedagogy in that it facilitated the relationship between the economics curriculum and the students' experiences, assisted the contextualisation of economics in real-life events, and economics became more relevant to the students. This is in line with the economics education literature such as Davies and Brant (2006), Piketty (2014) and Sober-Giecek (2000) who argue in favour of a pedagogical approach that "invites all the participants to bring their own experience, values, and vision into the dialogue" (Sober-Giecek, 2000, p.vi).

In the following three subsections, I discuss the teachers' attempts at facilitating economics education by using examples from their students' daily lives, their own life experiences, and the world around them. Teacher Mary referred to this approach as *"starting from a level where the students understand. It's then that students can experience economics as interesting, and more young people could then possibly choose to study it."*

8.1.1 Drawing upon students' experiences

A clear view emerges from my research data that teachers were keen to draw upon examples from their students' life to facilitate their engagement with the disciplinary knowledge in economics. Teacher Antonia referred to this pedagogical approach as *"employing the students' own world and facilitating their learning from what they know."* She often asked herself: *"What are my students' experiences from which I can draw examples to teach this concept? How can I teach this idea by applying it to the students' everyday life?"* One of her students, Svetlana, mentioned that it was not just

that *"the theoretical economics material was left on paper. It's applied to real life."* When asked which lesson she liked most, Svetlana replied: *"Sometimes our teacher narrates stories related to our interests. I relate to these and understand more. They may be simple things which everyone does. But she applies them very well to economics."* Some students reported how well they remembered these examples in tests and examinations, suggesting that this approach of using examples from the real world was powerful in that it provided them with epistemic access. This calls to mind the argument of Jephcote and Abbott (2005a) who argue that "successful learning is underpinned by 'tapping-into' learners' own interests …" (p.62).

Various examples relating to the students' life were used. Some related to experiences of their family businesses. Teacher Liberata, for instance, recounted how Sergio, whose family business sold doughnuts during village feasts, contributed *"many examples relating to specialisation, problems faced by small businesses, issues of breaking even, and insurance cover."* The students enthusiastically recalled the following example:

> *In each topic we had the doughnuts factor. [Students laugh.] … For example, we used it for the topic of specialisation. The teacher said that with practice you post them in the stall's tray with closed eyes - referring to the advantage of specialisation by process that practice makes perfect. ... We started bringing examples on the activity of doughnuts which I understood.* (Oswald)

Another example comes from Mary's class. Her students liked a particular snack, 'Pringles', which once tasted, they could not stop from eating it all. When she was discussing the effects of inflation, I observed her discussing that inflation was *"like Pringles. Once it pops, you cannot stop its spiral effects. So we must control it. … That's why the Central Bank aims for price stability."* Similarly, to facilitate her students' understanding about the barriers to entry in a monopoly, I observed how teacher Debbie introduced the lesson by referring to a student whose father owned a quarry: *"This firm has a natural barrier to entry. If I want to open up in this industry, from where am I going to buy a quarry? There isn't one available."* As a concluding exercise, Debbie invited her students to work upon a worksheet that consolidated the learning points of the lesson; I observed how they remembered the example of the quarry when they came to answer the question relating to the natural barriers to entry in an industry. When discussing outward shifts in the demand curve, I observed how teacher Christy remarked how last Sunday evening it suddenly started to rain: *"I know that when you*

went out in the afternoon it was sunny, but then it started raining. ... I bet that your demand for umbrellas increased." She discussed how there was a change in one of the factors that affected the demand other than price. Teachers Mary and Ian incorporated examples from their students' life in the worksheets they provided to their students, and allotted space where the students could illustrate further by writing and drawing their own examples. These examples relating to the teachers' efforts aimed at connecting economics with the students' lived experience calls to mind the term 'adaptive expertise' (Stobart, 2014), referring to the manner whereby teachers modified their lessons to incorporate their students' needs and experiences, thus enriching their learning. This adaptive expertise is an element of expert teaching that links what is being learned to what is already known by the students.

Two teachers, Mary and Ian, attempted to bring examples which they deemed were more relevant than the textbook examples. This is relevant because neoclassical economics textbooks tend to stick to the same examples. When discussing substitutes in demand, for instance, Ian discussed examples of goods which his students were interested in and not the *"traditional textbook examples of butter and margarine. … These are detached from the students' experiences and are totally uninteresting to them."* If he learned that they were interested, for instance, in buying a pair of jeans, he referred to pairs of familiar brands. He claimed that these were *"minor adaptations but which infuse flavour into lessons. When something interests the students, it captures their attention immediately and assists their understanding."* In contrast, some teachers tended to stick to the examples in their students' notes and textbooks. For example, when discussing the derived demand for labour, I observed Monica sticking to the example in her notes that the demand for carpenters depended on the demand for furniture. A student remarked that this was the same example illustrated on their notes. She prudently told her teacher: *"Miss, can you please bring us another example next time?"* Departing from the usual textbook examples and discussing ones which are related to the students' knowledge and experience would facilitate the students' encounter and engagement with the disciplinary knowledge involved.

The approach of relating economics to everyday life contextualised the subject in the students' life. Ian, for example, discussed how he mentioned the names of players from the games his students played: *"That's a way of catching and holding their*

attention." He enthusiastically recounted how he taught marginal cost (MC) linking it to the consumption of a health potion, a feature of one of their favourite games:

> *I tell my students: 'Your bar was full, you consumed it and went to another number.' When I explained the MC in that way, I had a joyful response. MC was something that I had struggled with when I was a student myself. ... So, I link these to their everyday games. ... They don't forget it easily.*

This is an example of the creation of a PCK representation that was intended to facilitate the students' understanding. The use of PCK representations is discussed in section 8.3.

To connect better the economics knowledge to the students' life experiences, most teachers prioritised into getting to know their students. Teacher Christy, for example, reported her effort to get to know the names of her students' boyfriends. I observed how she used these names during her lesson to arouse and maintain their attention. Two students commented to each another: *"How did she come to learn my boyfriend's name?"* Another teacher, Ian, recounted how upon taking a new class, his concern was to get to know his students' interests. He then attempted to *"take it from there in regard to lesson preparation, explanation and execution."* Teachers were also eager to know how their students learned. For example, Antonia *"loved it when bombarded with questions"* because she perceived this as a way to get to know their *"learning paths and processes and adapt the facilitation of learning accordingly."* This attitude of prioritising into getting to know the students is consistent with related literature and research findings (e.g., Kind and Chan, 2019; Mizzi, 2018, 2020; Shulman, 1987; Tomlinson, 2003, 2006, 2014; Turner-Bisset, 2001). Teachers who cultivate this attitude facilitate their students' engagement with the powerful knowledge involved.

Powerful knowledge as conceived by Young (2008) has been criticised for valorising academic knowledge above the everyday knowledge and experiences that students bring with them into the classroom (Catling and Martin, 2011; Yandell and Brady, 2016). The findings in this section 8.1.1 concur with these authors that everyday knowledge and experiences are other valid forms of powerful knowledge which need to be taken into consideration during the teaching and learning process. Teachers, for instance, valued and employed the baggage of knowledge and experiences that students brought with them to the lesson. So, whilst the subject is at the centre of the curriculum and pedagogy, students' knowledge and experience become 'the co-core' (Catling and Martin, 2011, p.329). The findings corroborate that the curriculum

becomes an expression of the interrelationship between these two powerful knowledges, "fostered by the pedagogical interactions between these two 'authorities'" (ibid.). The findings suggest that the teaching and learning process within these economics classrooms tended to offer students an opportunity for dialogue between the economics content and the students' knowledge and experiences.

8.1.2 Examples from the teachers' life

Most teachers were willing to share personal examples to facilitate their students' understanding of the concepts involved. Three students, Isaac, Sergio and Vince, recounted how their teacher shared with them anecdotes and reflections which set them thinking more about their own future enterprise:

> *She shared with us things that she does to help her husband run the business such as the drafting of the accounts. I liked it because she discussed a real scenario and not an imaginary one. It might be something that in the near future I would be doing if I become a sole trader. It would be a pity if I've to do these tasks like keeping the accounts and I would say: 'What are these?'* (Isaac)

Isaac suggested that this approach adopted by his teacher of sharing her personal experience enabled him to grasp better the notions involved. When discussing the backward-bending supply curve of labour, I observed his teacher Liberata narrating to her students that when she was engaged with her husband she assertively told him:

> *Either you work less or I leave you! We have enough money. Our priority should be to have quality time with each other. … My boyfriend had a high paying job but was working very long hours. He was hesitant to work less. So I had to be blunt with him.*

The backward-bending labour supply curve is a model illustrating a situation where as real wages increase beyond a certain level, an individual substitutes leisure for paid worktime and so higher wages lead to a decrease in the labour supply. Liberata remarked that *"the labour supply curve bends for me and my husband. This might also be the case for your parents. We've other priorities in life other than having money."* After some reflection time, student Christy explained how this happened to her mother: *"She has shifted to working part-time. … She wants to have more time with us to support us better."* I observed how by sharing her personal experience, Liberata facilitated her students' understanding of the backward-bending labour supply curve. I observed, for instance, how the students responded very well to an online quiz about this economic model that she organised as a conclusion to the lesson. There was also the opportunity to infuse values into a static economic model. Students had the

opportunity to reflect, for instance, upon the future job they wanted by considering their priorities relating to hours of work and leisure and the resulting investment of quality time with their beloved ones. This infusion of values cultivates a Future 3 curriculum.

Teachers Claire, Stephen, Mary and Liberata shared experiences from their family businesses to clarify the notions they were explaining. For example, teacher Mary discussed how she approached teaching the law of diminishing returns. She argued that the textbook example was not appealing to her students and that there were more interesting real-life examples that she could use. She therefore brought an example from her own experience when she worked as a waitress at the restaurant run by her family. During the summer, when demand for pizza was high, there was only one pizza oven. More workers were employed in an attempt to increase production. *"What's the problem that is then created?"*, she would ask her students. She would involve them into a discussion to help them understand how diminishing returns set in because the variable factor had increased while keeping the fixed factor constant. Mary remarked that her students mentioned this example in tests and examinations. This example assisted Mary to 'connect' with her students, facilitate their encounter and engagement with the notion involved, and bring to life the teaching and learning process.

My research data suggest that students remembered the examples from the teachers' life. During the interviews, students Vince, Luke, Svetlana, Sergio and Liam indicated how well they remembered these examples in tests and examinations. This was confirmed by four teachers who noted that students wrote these examples in their summative assessments to exemplify the concepts they were writing about. Teacher Carmen remarked: *"I say to myself: 'This example has really struck them.'"* Some parents even told her that their son shared with them the examples she recounted. When asked which lesson he liked most, student Chris replied that it was when his teacher narrated a story related to herself or her family and applied it to economics. These findings indicate that examples from their teachers' life tended to provide the students with epistemic access.

Teachers were aware that when they shared their experiences, students were more willing to open up and share theirs. Teacher Grace, for example, contended that if she did not share her experiences, *"students will not tell theirs. If I open up, they give back their own experiences."* To facilitate this interaction, teachers cultivated a safe classroom climate (section 8.5).

8.1.3 Examples from the real world

A common theme emerging from the data is that real-life examples facilitated the students' engagement with the economics knowledge involved. When asked what helped them to grasp a concept, students Vince and Oswald were prompt to mention *"relevant examples from real life"* (Oswald). Another student, Kyle, was grateful that his teacher was attempting to include *"as many real situations as possible to facilitate their understanding."* These real-life examples assisted the contextualisation of economics in the students' life experience and in the local, national and international contexts. In contrast, four students from another class were disappointed that their teacher did not discuss more examples about *"what's happening at the moment"* (Alex). They mentioned issues such as the Brexit situation, the conflict in Libya, Malta's EU membership, bitcoin and cryptocurrencies (discussed in section 7.5).

By referring to what was going on in the real world, teachers adopted a back-to-front approach which first explored reality and then discussed economic theory (Brant, 2015). Teacher Franky referred to *"cross-referencing what's being discussed in theory to what's happening in practice. In the beginning, it's the teacher who needs to assist the students by providing the necessary links as this does not come naturally for them."* I observed him presenting to his students a PPC with roads on one axis and trees on the other. This related to a local environmental issue concerning the widening of roads at the expense of agricultural land to accommodate the increase in traffic in Malta. The teacher invited his students: *"We need to use our economics knowledge to discuss the government policies, evaluate their costs and benefits vis-à-vis the environment and traffic. That's how economics needs to proceed."* A discussion ensued where students participated actively. In a similar vein, Robert discussed selecting a real-world event and *"explaining it through economics."* I observed him discussing, for instance, the economic consequences of a storm throwing over in the roads fish from the nearby fish farms. He urged his students: *"This is happening now. ... Let's explain the effect on the market price through economics."* Robert also occasionally shared news articles with his students and asked them to deliver a short presentation to discuss *"the economics involved"*. By starting from real-world evidence and getting the students to discuss possible explanations of a phenomenon, teachers adopted a retroductive approach to learning economics (Brant, 2011, 2015). Through this back-to-front approach, they first explored reality and taught economic theories not as facts

but as explanatory tools to comprehend better the forces and tendencies at work in the economy.

Teacher Carmen contended that the crux of teaching economics was *"providing the students real examples that they can relate to."* When discussing the factors affecting the location of business, I observed her discussing a nearby firm selling local agricultural products and running a restaurant. She explained how the restaurant was near the raw materials and not close to the market: the vegetables came from the nearby fields while clients came from different locations, attracted by the traditional physical features of the locality. The firm was involved in a weight-losing activity in the sense that its input was heavier than its final product. She used an example which students were familiar with because it was close to their school. Another example comes from Liberata's classroom. While explaining the topic of location of business, I observed her discussing how a snack bar had opened close to her home. The entrepreneur targeted a location *"close to the customers. ... He became aware of this niche and stepped in."* She elicited the social costs and benefits involved. Her teaching approach tends to be powerful in that besides drawing upon a real-life example, it assisted her students to consider the social dimension of economics, which is missing in neoclassical economics, in terms of the effects of economic activity on society, thus helping her students perceive economics as situated in an open social system with a multiplicity of mechanisms, structures and agencies in play (section 2.1.5).

To explain the notions of demand and supply, teachers brought examples of commodities which students consumed. These included ice-creams and lampuki, a fish which is typically caught in Maltese waters during the months of August till December. Being a hot day, Mary brought over to class an ice-cream to explore her students' demand and come up with the demand curve:

> *I ask my students: 'Who would like to buy the ice-cream which is in this cooler bag?' Very often not all the students would have money. I explain that demand is not just a want. It also involves the ability to buy. The concept starts to emerge. Because from ten students, for example, five would have the money. ... The others cannot buy it. We build up the definition through that example. Then I start with a price. 'At £5 how many of you would like to buy it?' We have, for example, three students. 'If I reduce the price to £4, how many would buy it?' I make it real. I write down the figures. I ask them: 'What are you noticing?' Very often they notice a negative relationship between the price and the quantity demanded.' Then we plot the demand curve together.*

In contrast to what happens in neoclassical economics, Mary did not just come up with the demand curve and presented this economic model as if it was a real entity. By using a back-to-front approach, she first explored reality, in this case her students' demand for ice-cream, and then presented an economic model which was predicated on reality and taught it as an explanatory device that assists the understanding of the mechanisms at work which influence the price and the demand for a commodity. This pedagogical approach facilitated the students' encounter and engagement with the disciplinary economics knowledge involved, in this case the demand curve. This economics knowledge was not presented to students in a dogmatic manner. Students were taught to perceive it as a tool that assisted them to understand better the forces of demand in the world around them. This powerful pedagogical approach nourishes a Future 3 curriculum.

Teachers also asked their students to research local examples. For example, Ian and Caroline asked them to investigate the types of business organisations in their neighbourhood. Students were assigned to present their findings and incorporate them in their notes. By being assigned to research their local context, students were educated to 'incarnate' economics in their immediate surroundings. This pedagogical approach could provide the space for the transformation of the disciplinary knowledge involved in such a way as to be relevant to the students and provide them with a better understanding of the world around them.

Some teachers discussed events occurring in other countries which were related to particular macroeconomics topics such as unemployment, inflation and international trade. For example, Mary, Robert and Grace referred to inflation in Zimbabwe and Venezuela: *"It's something that's real for students. They get interested and engaged in the discussion"* (Grace). Mary narrated how she got her students *"hooked up in inflation through a case study"*:

> *When I was teaching inflation there was the case of Zimbabwe experiencing hyperinflation. I used it as a case study. I divided the students in pairs and told them to highlight what they found interesting and why. The majority said that this was hyperinflation. I wrote it on the board and asked them what it means. They all linked it to problems. I told them to remove for a moment the word 'hyper'. 'What's inflation?', I asked them. We tried to investigate how it comes about. … Through the case study we built up together the basic knowledge about inflation. They were attributing it to this country. It was very interesting because it was happening. For example, they were surprised by the loss of value of the currency. ... I like giving students a case study because they realise that it's realistic, it's happening. If you*

don't use something from real life, you can have students who say: 'Ohh, the teacher is exaggerating!' or 'She's making up things.' By providing them with the case study, the students persuade themselves that it's realistic. But then they have to investigate what's happening. And they grasp the concepts from there. A discussion then follows in groups to elicit the advantages and disadvantages of inflation.

Mary's pedagogical approach of first exploring reality to assist the understanding of the notion of inflation echoes Piketty (2014) who emphasised the importance of economics being grounded in strong empirical data. In a similar vein, Robert discussed with his students the measures introduced by the United States relating to trading blocks:

These were issues which featured in the news. ... We were about to discuss the topic relating to the restrictions on free trade. … This real-life example helped me to explain better. In a way, either because we're lucky or because economics is vast, I always find something relevant on the news.

This finding of teachers discussing examples from the real-world scenario is in line with the economics education literature such as Davies and Brant (2006), Piketty (2014) and Sober-Giecek (2000) who argue in favour of "a pedagogical approach that emphasises a collective exploration of economic data, trends, and issues, and invites all the participants to bring their own experience, values, and vision into the dialogue" (Sober-Giecek, 2000, p.vi).

8.2 Emphasising the process of reasoning

One of the issues indicated by the data was that many students tended to study the economics content by heart. A pedagogical approach to alleviate this problem was emphasising the process of reasoning.

The summative assessments, especially the SEC examination at the end of the economics course, influenced the students to study the economics content by heart. Teacher Robert discussed how many students tended *"to settle in a comfort zone, just studying economics by heart and feeling that they know the subject."* He recounted how during the introductory lesson of the course, most of his students begged him: *"Sir, give us a lot of notes, homework and tests. Don't worry if we understand or not. Just give us good notes. That's all we need."* This episode suggests that these students were accustomed to rigidly following a set of notes. This is an aspect of a Future 1 curriculum characterised by the passive absorption of knowledge and studying by heart that tends to lead to shallow learning and hindering the development

of thinking in the subject. Robert got frustrated when later on during the course he realised that some of his students were not grasping the content because they were studying by heart: *"When I challenge them to provide a critique of a particular situation, I realise that they don't really know the concept."* He exemplified with the following anecdote:

> *We watched a video when Mark Zuckerberg was taken to court to be interrogated about whether there existed a monopoly or not. We had just covered monopoly. Some students found it difficult to relate to the issues involved. They seemed to be happy studying the notes by heart: 'Perfect competition is ...; monopoly is ...' I told them: 'You see! You didn't grasp the topic.'*

Within this context, the data sources suggest that teachers emphasised the process of reasoning to get their students engaged with the economics knowledge involved. For example, I observed Stephen, an experienced teacher, discussing with his students that economics was *"more about understanding and reasoning it out. Studying the subject by heart leads you nowhere. Unless you have reasoning in economics, you're lost."* Stephen's thinking was reflected in the assessment he used:

> *I often tell them to evaluate an article by applying principles from economics. Then we have what I call the 'viva' - a face-to-face assessment. I have a discussion with each student. I tell him: 'You need to provide a reason for each concept you discuss.' … I give a mark for this viva, which is part of the end-of-year assessment.*

In a similar vein, teacher Mary maintained that she never gave importance to the final answer: *"I'm not the type of teacher who provides a sample answer. I emphasise the process, how students proceed in their reasoning."* She remarked that students might not understand how important the process was. When she started to draw and explain the aggregate demand-aggregate supply graph, I observed that some students started copying from the whiteboard. Mary immediately drew their attention: *"Don't draw it now. Just follow and think about it."* She attempted to guide them to engage with the economics knowledge represented by the graph and not just take it as given. This echoes teacher Stephen who required his students to *"know the reasoning behind graphs. You need to learn the graphs by reasoning out what's going on."* These teachers adopted a pedagogical approach that required their students' active engagement to introduce them into the realm of disciplinary knowledge in economics, assisting them to acquire concepts that helped them to start to think in the subject.

To facilitate the process of reasoning, two teachers suggested focusing upon the understanding of the concept involved. Mary explained the process she followed:

> *I use brainstorming: They tell me the words, which I write on the whiteboard. I highlight the important ones. We then find the one that's the keyword. For example, if we're talking about elasticity, the keyword is 'responsiveness'. I emphasise that and we build up the definition together, focusing on the keyword. Because if they remember a keyword, they're able to come up with a sentence and maybe also an argument.*

Mary's argument of focusing on a 'keyword' acquires relevance in that English was not the native language of the students; Maltese was their first language. Concentrating upon the concepts involved might have assisted those students who experienced difficulty in speaking fluent English to articulate better an economics argument. In a similar vein, teacher Robert discussed the importance of understanding *"the core element or key that unlocked the topic."* He exemplified by referring to a student who was asking him about inflation and confusing it with excess demand and supply. This student studied most content by heart. She had scored very well in a test on inflation. However, Robert realised that she had studied *"all the details by heart without really grasping demand-pull inflation."* He tried to help her understand *"the core element or key that unlocked the topic which when grasped all details fit in and make sense and can be seen vis-à-vis the main issue."* He tried to *"simplify, as if in one slide, the main concept that needed to be learned."* These two examples from Mary and Robert suggest that a useful pedagogical approach to assist the students to engage with the disciplinary knowledge involved was to focus their attention upon the concepts involved, ensuring that they understood them to avoid the common temptation of studying the content by heart. Mary discussed how she once assisted a student from another school who was not understanding Year 9 economics; this student was studying by heart the detailed notes that her economics teacher had given her. Mary offered to give her some lessons, focusing her attention upon the concepts involved. Once she understood, the student told her: *"Did we cover everything? Because I've really understood!"* Mary replied: *"Go through your detailed notes and persuade yourself that we've covered everything."* By adopting the pedagogical approach of focusing upon reasoning the concepts involved, Mary empowered the student to engage with the economics knowledge involved and not just follow in a rigid manner her set of notes (the latter being an aspect of Future 1 curriculum thinking). She could then possibly experience the joy of deep learning and, hopefully, that of thinking in the subject, a characteristic of a Future 3 economics curriculum.

There existed however the temptation and pressure in these classrooms to teach and study for the summative assessments. For example, I observed four teachers 'training' their students how to answer examination questions. Teacher Christy, for instance, emphasised with her students that *"if you don't provide examples, you're not going to score high marks. You distinguish yourself in exams with the knowledge and the examples that you write."* Three teachers encouraged learning by heart in an attempt to achieve high grades. I observed Monica instructing her students:

> *Do study by heart these factors influencing supply of labour. This is the practical course of action to follow in order to perform well concerning the material that you haven't perfectly understood. … We must be practical. There's a lot of material to study. Those of you with photographic memory can consign everything to memory.*

These episodes from Christy's and Monica's classrooms illustrate how the summative assessments affected the teaching and learning process by exerting influence on the teachers' pedagogy to teach to the examination and for the students to study the economics content by heart. There was the pressure for the economics content not to "stray from the published syllabus, where teacher exposition and directed activities crowd out any room for learners' inquisitiveness and classroom assessment strategies are only those used by the examination board" (Jephcote and Abbott, 2005a, p.60). This approach relating to the passive transmission of knowledge in a Future 1 curriculum does not cultivate the students' capability and their sense of agency that empower them to understand the economic world and to mature into responsible citizens, consumers and workers.

In contrast, the pedagogical practice of assisting the students to reason out economics supports young people to engage with powerful disciplinary knowledge in a Future 3 economics curriculum. This powerful pedagogy fosters deep learning, thinking in the subject, and better results in examinations. Student Alex, for example, explained how in Year 9 he had studied most of his economics by heart and did not understand the topics well: *"My marks were very low."* In the subsequent years, he tried *"to make sense of the material covered by reasoning it. For example, instead of studying by heart the topic of national income, I made a conscious attempt at understanding each component of the national income."* He argued how his marks in tests and examinations *"improved drastically. There wasn't then the need to memorise."* This supports the argument that deep learning brings about better examination results.

A somewhat different example comes from Franky, an experienced teacher. He emphasised with his students that besides *"knowing the content and learning it by heart, they also needed to understand it, be able to analyse and apply it, and give examples. That's how I basically go about most of the syllabus."* He referred explicitly to following Bloom's taxonomy:

> *It's knowledge, application, analysis and evaluation ... from Bloom's taxonomy. I try to follow it in class. Even in the written examination, that's how I write the questions. I tell them beforehand that the first question is going to be a recall of knowledge. So if you learn the definition by heart, ok, you just write it down. However, then you won't be able to proceed further because the next question will be about application, the next will be about analysis, and the last question will be about giving the advantages, disadvantages, recommendations - providing an evaluation. So, I tell them that these are skills that they have to learn. It's not just learning content, but learning skills as well. We're all about learning skills nowadays, more than content.*

While there might appear to be an emphasis upon grasping the knowledge involved, Franky might be implying a generic approach to teaching economics in the form of following Bloom's taxonomy. This approach might assume that there is a body of knowledge and a collection of generic thinking skills which are equally applicable in the various disciplines. Students might be 'drilled' to use the assessment language proposed by this model rather than grasping the economics disciplinary knowledge arising from the epistemic community. This learning environment might not be conducive to the cultivatation of powerful knowledge and might steer away from a Future 3 perspective. By focusing too heavily on specific competences and generic skills, a Future 2 curriculum might be nourished characterised by an experience-based Future 2 pedagogy, impeding the students from developing and practising powerful disciplinary knowledge.

8.3 Employing specialist knowledge to develop PCK representations

My research data suggest that most teachers attempted to develop a variety of PCK representations to facilitate a meaningful encounter between their students and the economics knowledge prescribed by the syllabus. Representation is defined in section 4.2 as the ways of communicating the concepts of a subject. Teachers tried to make the economics content accessible to their students, enacting it in a manner as to make the subject relevant, alive and worth studying. Teacher Ian recounted how representations came to mind during informal times such as when driving: *"I immediately take note of these ideas."* He discussed about *"thinking creatively"*:

I try to read between the lines in the news. There're many things that I can use to make the content appealing. It's a matter of being creative: finding ways of getting extracts from things that students engage with every day and apply them to economics. I think that's the primary challenge: finding something and thinking, 'What can I extract from this?'

This quotation suggests that he thought hard how to transform the economics knowledge into a repertoire of representations that enhanced his students' learning. For example, I observed him enacting a discussion by showing his students a paper bag that he had found on a train in Brussels. The bag was advertising a local beer. He used it in the topic of international trade to elicit the advantages of countries trading with each other. The representations that were developed by Ian and the other teachers suggest that they drew upon their own specialist knowledge relating to how best to assist their students into acquiring subject knowledge that might initially be experienced as alien. It appeared that the various knowledge bases indicated by the literature (section 4.2) merged to produce PCK that underpinned the teaching and learning of economics and assisted the students' engagement with disciplinary knowledge in a Future 3 economics curriculum. The amalgam of content and pedagogy refutes the dichotomisation suggested by the notion of powerful knowledge that the curriculum ('what to teach') can be separated from the pedagogy ('how to teach'); the questions regarding 'what to teach' and 'how to teach' are interrelated.

The data discuss a number of representations. For example, I observed Caroline recounting how two business partners wanted to introduce another owner and establish a limited liability company. She gave three students, representing the three owners, cheese portions from a round 'La vache qui rit' box, wrapped in individual serving-sized foiled wedges. The students had 40%, 40% and 20% of the portions respectively. Caroline discussed with her students that these percentages represented the shareholding in the company. From the way her students answered correctly the exercise at the end of the lesson, I noted that this representation assisted them to understand the notion of shares; this is an idea which students tend to find difficult to grasp. Two interviewed students from this class mentioned how the enactment of this representation helped them to score well in a test question about shares, suggesting that the teacher had managed to transform content into a pedagogically powerful form that helped the students grasp the idea of shareholding.

Another example of a representation was the use of *"the metaphor of the football match"* by teacher Mary. She used it to help her students understand that it was not a one-off increase in demand that caused demand-pull inflation but an increase in demand when the economy was operating at or near full employment level:

> *When the ground is empty, is there an effect on prices when people come to watch the game? ... No. There's an increase in demand, but there's no pressure on the price. But when the ground is nearly full, nearing full capacity, speculators start pushing ticket prices up. It's when the ground is nearly full, and there's still demand, that prices start to rise. This also happens in concerts.*

She referred to this representation a number of times during her lesson to reinforce her learning objectives. For instance, she compared the excess capacity of an economy to the situation when the football ground was empty, and the inflationary pressures when the economy approached full employment to the situation when the ground was nearly full. Similar to the other experienced teachers, it appeared to be second nature for Mary to think about generating PCK representations that animate the economics content. In contrast, I observed teachers who possessed limited teaching experience struggling to devise these representations. For example, being her first year of teaching, Debbie was finding it difficult how to explain to her students the idea of a country's balance of payments: *"The topic seems to be so detached from their experience that I cannot think of relevant ways how to explain the notion. In the first place, I need myself to work to be confident about the content itself."* These examples from Debbie and Mary imply that a grasp of the substantive knowledge involved was a prerequisite to the adoption of a pedagogy that supported the students' encounter with powerful knowledge in economics. Otherwise, there exists the tendency for inexperienced teachers weak in substantive knowledge to be overreliant on textbooks, notes and mechanistic approaches that promote a Future 1 curriculum.

My research data suggest that teachers thought hard how to develop PCK representations for topics they did not look forward to teaching. Teacher Ian, for instance, experienced the topic of financial institutions as too detailed: *"Students can read the functions of these organisations from their respective websites."* He attempted to teach the topic in an appealing manner by *"being creative ... It becomes equally interesting."* He discussed how he approached teaching the topic of production:

> *When I was a student, I did not like product curves, costs of production and economies of scale. These are about numbers, graphs and plotting, which I did not*

like! At that age, I did not perceive this topic of production as important. So, I sort of put a label on it. When I was about to teach it, I was not happy with it, because the label stayed with me. But I wanted to make something different. I wanted to make this topic interesting for my students. So I ended up changing my whole approach. For example, I started using examples from a game that the students played. ... They understood at once. ... That was a different way of approaching things!

This topic of production became his favourite one to teach. He claimed that this happened because he thought *"creatively how to make this topic appealing."* He argued, for instance, that he could have simply defined productivity and efficiency to his students. Instead, I observed him devising a representation that included a *"numbers game"*. He brought two students to the whiteboard to play the game; it seemed to me that he wanted to involve these students who appeared somewhat restless. The representation involved comparing two countries with each other in terms of milk production. The game was structured in such a way that by uncovering a piece at a time, the ideas of productivity and efficiency were elicited. So, for example, the United States had 10,000 cows producing 90,000 litres of milk every year, while India had 100,000 cows and was producing 50,000 litres of milk. The students understood that each cow in the United States was producing more than the Indian cow. A discussion ensued where the teacher consolidated the ideas of productivity and efficiency. Students then worked upon a handout in pairs, followed by class correction. Most groups scored very well in this pair work. Ian's effort at providing his students with an interesting encounter with economics knowledge that might seem unappealing to the teacher himself has managed to generate a rich form of PCK. I concur with Shulman that this PCK represents the teachers' "special form of professional understanding" (Shulman, 1987, p.9).

During her early years of teaching, Liberata experienced the PPC as difficult to explain to her students. By developing a PCK representation that related to her students' experience of studying and relaxing after school, she was now finding it enjoyable to teach:

I tell them: 'How many hours do you have available after school before you go to sleep?' We calculate, for example, five hours. I ask them: 'What do you do during those five hours?' They come up with some responses. So basically they enjoy hours of leisure - watch television, eat, play, … - and they have hours of study. I plot: zero hours of leisure and all study, studying three hours and enjoying two hours of leisure, and so on. We start increasing leisure time and decreasing study time, hour per hour. The opportunity cost emerges. We plot together a PPC on the whiteboard. Then I tell them: 'What if we sleep during the time when we're supposed

to be studying?' That's inefficient use of resources; when I sleep, I'm doing nothing ... Then I ask them: 'You need to study for four hours but you have two hours for leisure. So you need six hours. It's outside the curve. You cannot do it with your present time and resources.' Then I ask them: 'What can be done?' 'Eh, we can stay another hour studying. ... A way of increasing our resources. The PPC shifts outwards.' I tell them: 'What happens if you start arriving home one hour later? The PPC shifts inwards. I write down these points on the whiteboard. I then explain that the same thing that happens in the everyday life of studying and leisure can happen for a business, a government, and for a whole country. I then plot a PPC of a country. Points on the curve, points inside and outside.

Liberata started off with her students' personal experience and then moved on to the theory: *"It assists them to make the connection between the PPC and their personal life."* It echoes Mary's argument of *"starting from a level where students understand."* She took photos of the work on the whiteboard relating to the PPC and shared them with her students. They printed them out and kept them as notes. She remarked that *"by time I realised that they were really remembering the PPC, even the struggling ones, especially when answering the questions in tests and examinations."* This was a representation that some of her students mentioned in their focus group; Vince referred to it as *"an example that I keep remembering."* This example from the students' daily life seems to have provided them with the opportunity to engage with the disciplinary knowledge involved, exemplifying that "everyday knowledge is a valuable resource for students" and teachers (Roberts, 2014, p.195). In contrast, Monica and Robert remarked that when explaining topics such as national income, the balance of payments and monetary policy, students' experiences in these areas was limited, and it was therefore difficult to bring examples that were related to their experiences. The approach of capitalising upon everyday knowledge and experiences provides students with a better engagement with the disciplinary knowledge involved, thus nourishing a Future 3 curriculum.

8.4 Adopting a variety of teaching strategies

My research data suggest that teachers attempted to widen their pedagogical repertoire in order to facilitate their students' encounter and engagement with the disciplinary knowledge in economics. For example, student Svetlana reported how lessons were *"varied and included interesting and different ways how to learn the economics topics."* Teacher Liberata recounted using *"a varied pedagogy to catch and hold different interests. Lessons include discussions, formal teaching, questioning, analysing articles, case studies, examples, role plays, games, video clips, the*

cooperative jigsaw technique, and presentations by students." Similarly, Grace discussed how she attempted to include *"a taste of everything to maintain the students' attention. ... Different strategies that cater for different learning preferences and provide different entry points into learning."* I observed how she included in her lesson quiet individual work, group work, presentations, activities, and then herself consolidating the main points. The skill of organising a *"varied lesson structure"* (Grace) is an important element of expert teaching that can provide students with access to knowledge that cannot be gained from everyday experience.

Besides providing engagement with disciplinary knowledge, the variety of teaching strategies assisted students to enjoy learning economics. For example, I observed on three occasions students enthusiastically coming over for their lessons and joyfully asking: "*What are we going to learn today?"* On four other instances I observed some students staying some minutes after the lesson discussing issues related to the content discussed. This situation suggesting young people savouring the joy of learning economics is in contast to the reputation that economics had earned as being a "dismal science" (Friedman, 1953, p.30). Teachers Robert, Ian and Christy perceived the challenge of how to promote economics in such a way that students would say to each other: *"Wow, how beautiful economics is!"* (Robert). Mary emphasised that teachers need

> *to intrigue students to think further, to try guessing what's coming next. ... Even just affixing a picture on the board and discussing it. Or writing a figure and asking: 'What does this 14% represent?' Students start guessing and discussing. I experience that these approaches do work.*

Like most of the other teachers, Mary attempted to get her students involved during her lessons. She maintained that *"students won't get hooked up if, for instance, I deliver a fifteen-minute explanation."* She discussed how during her first years of teaching, she thought that she had to *"do the show and the students just listen. Nowadays I try to work the other way round: the students open up the show and then we build up together."* She perceived her role as *"a facilitator of learning, in the sense that I'm not the centre of attention, but I'm creative in involving them through the various learning strategies. ... They often start asking: 'What's coming next?"* This comment from this experienced teacher underlines the role of a student-centred pedagogy that is powerful in that it assists students to engage in a creative manner with the knowledge that is specified by the syllabus. I observed her, for instance,

assigning her students into groups to elicit their knowledge about the functions of the commercial banks. Each group then presented to the whole class while affixing on the whiteboard the ideas they had written on coloured charts. This was then followed by a whole class discussion that enhanced the students' engagement with the disciplinary knowledge involved.

In the following subsections I discuss teaching strategies that I have identified in the data.

8.4.1 The introduction and conclusion of lessons

Most teachers attempted to arouse their students' motivation at the introductory stage of the lesson. For example, I observed teacher Ian inviting six students to draw a flashcard from a bag. For each flashcard drawn, students had to identify the fixed or variable factor of production referred to by the statement written on that particular flashcard. They were then asked to explain how diminishing returns set in. I observed how this student involvement managed to 'catch' and 'hold' the students' attention (Dewey, 2008). Students referred to the importance their teachers gave to introducing each lesson adequately. Svetlana mentioned how their teacher involved them *"in an interesting recap. ... I tend to forget things, and so the revision at the beginning of the lesson helps me."*

Students also discussed the importance of grasping the introductory lessons of each topic. Luke, for example, perceived the first lessons of each topic as the most important because they would be *"building the base to learn a new topic. If I don't understand a topic from the beginning, I may remain stuck. I need to grasp it immediately because then I might find it difficult to understand it by myself."* This ties in with the literature which urges teachers to pay particular attention to the manner in which students are introduced to threshold concepts (Davies, 2006; Meyer and Land, 2005, 2006). If a teacher, for instance, introduces a threshold concept prematurely, it might become inaccessible to the student and "can only be learnt in a rote fashion which emphasises its lack of real meaning to the student" (Davies, 2006, p.76).

I observed seven teachers assigning importance to the conclusion of their lessons. For example, eight minutes before the lesson ended, I enjoyed listening to the students in Charles' class expressing aspects of their learning when they were invited to do so. The lesson concluded with a video clip summarising the characteristics of limited

liability companies and the students worked upon a short consolidation exercise relating to the ideas of shares, limited liability and separate legal entity. The conclusion to the lesson enacted by Charles was powerful in that the students were provided with a final opportunity of engaging with the economics notions involved.

8.4.2 Activities, games and mind maps

My research data suggest that activities assisted the students' engagement with the substantive knowledge involved. Students mentioned activities which they particularly enjoyed, facilitated their understanding of the notions involved, and were remembered during their summative assessments. Student Kyle explained that he understood better when he had *"experienced the content through an activity."* Students mentioned producing shirts to learn about specialisation, dividing a cake and producing chocolate cupcakes to understand the notions of shareholding and production. They argued that they experienced these activities as enjoyable because they could use their imagination in learning. With reference to the cupcakes activity which was organised by a student teacher, students discussed the importance of following up an activity to ensure that the notions involved were grasped. They argued that the *"explanation of the economic theory involved was a bit lacking, because we spent so much time on the activity itself. On taking over the class from the student teacher, our class teacher had to re-explain it"* (Svetlana). This finding highlights the importance that besides *"igniting enthusiasm in the classroom"* (Claire), activities need to engage students with disciplinary knowledge. It calls to mind Puustinen and Khawaja (2021) who draw the attention to "situations that may look engaging but which ultimately do not support disciplinary learning" (p.26). When organising an activity involving the production of smoothies during the topic of production, it appears that teacher Mary paid attention that her students engaged with the knowledge involved:

> *I ask them: 'Bring two fruits from home.' The parents send me a message: 'Why do you need fruit for an economics lesson?' They get interested and curious. ... We did the smoothie together in the classroom, and had some juice as well. Students had to explain what was happening. We had the factors of production, we input them, transformed them, and had the output. There was the transformation of inputs into an output. Through this activity we revised the fixed capital, for example the mixer, and the liquid capital – the fruit. They're seeing it happening. ... Once I use this example, I continue building upon it. For example, if we're discussing the selling of a product, I ask them: 'We have produced the smoothies. How can we sell them?' I continue with the same example, not just use it once. ... They therefore experience*

and remember it, and at the same time, we continue building upon it, thus assigning more relevance to the activity.

During the focus group interview, Mary's students vividly recalled this activity; they remarked that it assisted them to score very well in an examination question. By being engaged with the economics ideas involved, students appear to have experienced this activity as a powerful pedagogical tool that provided them with the opportunity to experience deep learning. This brings to mind that argument of Jephcote and Abbott (2005a) that "successful learning is underpinned … by motivating learners through interesting, challenging and relevant activities" (p.62).

Teachers Robert and Ian suggested that games had the potential of providing epistemic access through the manner in which students got engaged with the disciplinary knowledge involved. When asked about a lesson where he perceived that his students had learned, Robert referred to one on market structures:

I started with a game. I think it was really effective because it covered other topics. I gave the students some tokens. I was the supplier of mint sweets. Each student had to first purchase the mints and resell them at a price. They had to compete with each other because I would only buy at the best price. So they started to lower the price. Some started to lower the price below the cost price. So it was predatory pricing, and they started to try to eliminate each other, but at the same time destroying themselves because they weren't doing any profits. … When two of them went bankrupt, they decided to join the others. Without giving them any hints, they started to join clusters. It's like doing amalgamation. It ended up that one of them won. But still she ended up bankrupt because she was selling at a price which was so low to beat the other one. … Through this game I could explain monopoly, perfect competition, oligopoly, cartels, merger and takeovers. It was an effective way to understand these concepts. The game maintained their attention, they could study through it, and apply what they had previously learned.

This game appeared to provide the students with a meaningful encounter and engagement with the disciplinary knowledge involved. Besides maintaining their attention, students had the opportunity to engage with and experience the ideas and the concept involved, namely the threshold concept of 'price formation through interaction between markets'. Robert was wise to ascertain that students engaged with this disciplinary knowledge. It might happen that indulging students in a game without ensuring a deep encounter with the substantive knowledge involved risks lapsing into a Future 2 curriculum with its lack of emphasis upon grasping disciplinary knowledge.

Four teachers argued that mind maps, web diagrams and graphics facilitated the students' process of reasoning the economics knowledge involved. For example, I observed Mary gradually constructing with her students a mind map illustrating the causes of inflation. She discussed how mind maps assisted her students' engagement with knowledge by consolidating the salient points: *"We build them together. ... When they look at them later, they will remember what we've done. If students remember the mind map, they are assisted to write a paragraph about the notion involved."* The mind map was assisting Mary's effort to help her students engage with the notions involved.

8.4.3 Case studies

Case studies seemed to provide students with the opportunity to engage at a deep level with the economic concepts involved. Students Peter, Christy and Svetlana liked it when they had the opportunity to apply the tools they had learned to analyse an economic situation and propose solutions. I observed their teacher Grace organising the students into groups to discuss a case study relating to the disadvantages of growth faced by a firm designing online games. Instead of *"dishing out the disadvantages and that's it"*, she devised this case study so that her *"students could critically discuss the disadvantages."* I observed that the students enjoyed it, especially since it related to their online gaming experiences; they were invited, for instance, to name the firm, imagining it was their own business. Besides contextualising economics in real life and making it more relevant to the students, case studies assisted the students to become active participants in their own learning. As an engaging pedagogical tool, case studies tended to provide the students with the opportunity to increase their awareness of the economic scenario, widen their perspectives, acquire comprehension of the disciplinary knowledge involved, apply concepts, make judgments, and propose and discuss economic courses of action. These are aspects of a Future 3 economics curriculum.

8.4.4 Role plays and drama

Role plays enacted during the economics lessons provided the students with the opportunity to engage in higher order thinking that assisted them to critically evaluate an economic scenario and propose solutions. These aspects promote a Future 3 curriculum. For example, a particular lesson student Oswald remembered was when their teacher helped him through a role play *"to put himself in the shoes of an employer.*

He asked us: 'What's your response to employing the seventh worker?'" The lesson was about the marginal productivity of labour. Oswald reported that this role play assisted him to *"grasp the theory better."* Students referred also to role plays enacted to consider aspects relating to running one's own business. Through active engagement such as through the use of the imagination, role plays assisted the students to develop a deeper understanding of the disciplinary knowledge involved, especially when they were followed up by a discussion that consolidated the ideas involved.

At the beginning of her lesson, I observed teacher Claire involving herself in drama. While she was preparing herself, Simone, a teacher who came to assist her, showed the students a video clip about a news item from the Maltese Central Bank informing the public that the old Maltese currency used before the introduction of the euro should now be exchanged at the Central Bank and not anymore at the commercial banks. Once the clip was over, Claire entered the classroom dressed as an old farm lady, Lucy. While exaggerating her suffering from rheumatism, Lucy explained how she had brought with her a bag full of old Maltese notes which she demanded to be exchanged to euro in cash. She explained that they were hidden under a floor tile in the bathroom. Simone, acting as the bank official, tried to convince Lucy that nowadays money was deposited into a bank account. Showing her ignorance on the matter, Simone invited Lucy to learn with the students about the functions of the commercial banks, in particular the services they provided. The students laughed during this role play. I observed Claire being keen to follow up and discuss with them the functions of the banks and aspects of financial literacy, such as an awareness of the various bank accounts and drawing their attention to the various bank charges. Being at the introductory stage of the lesson, this humorous play grasped the students' attention and aroused their motivation to engage with the economics knowledge involved.

8.4.5 Group work

The data suggest that group work facilitated the students' engagement with economics knowledge. Student Dwayne, for instance, recounted that he enjoyed it *"working together in an environment where everyone can voice his opinion, write his ideas, and reflect on what we've said. We then present to the whole class."* The group work mentioned by teachers included the think-pair-share strategy and variations of the jigsaw cooperative learning technique. Mary discussed how she organised the think-

pair-share strategy: *"A student first thinks about the economic argument involved, discusses it with his classmate, and then they share it with the class. They really enjoy it."* I observed Charles employing pair work related to a fictitious gaming company to elicit the characteristics of private limited companies. Students worked on a handout and could refer to their notes to clarify their ideas. I observed how they got involved, particularly because most of them were interested in joining the gaming industry.

Group work was also used when engaging the students in research work; teachers reported that students enjoyed researching examples in the local context. Student Jake, for instance, noted that researching financial information helped him learn about what was happening around him. Before starting a topic, his teacher Christy assigned the class research about the ideas that they would be considering during the lessons so that they acquired *"background knowledge which they then can share with the class."* I observed two other teachers asking their students to bring information relating to the type of business organisations in their localities. These assignments assisted the students to contextualise economics in the local context and perceive it as a tool that facilitates the understanding of the world around them.

8.4.6 Employing discussions

A clear view emerges from the data that teachers facilitated a deeper understanding of the economics knowledge involved through discussion, assisting the unpicking of real-world events and developing a nuanced understanding of economic situations. This finding is in line with the assessment objectives spelled out in the Maltese secondary school economics syllabus expecting students to be able to clearly discuss economics content (MATSEC 2021, n.d.).

The teachers' and the students' voices report that it was easier to understand *"theory taught through discussion"* (student Luke). Teacher Grace discussed how her *"experience during the lessons as a secondary school economics student was reading from a textbook. My understanding was limited. I shall never do this in my class! I want students to discuss to acquire a solid grasp of the content."* She contended that since the discussion *"cannot be undertaken by the student at home"*, it needed to be done in class. Another teacher, Carmen, claimed that discussions assisted her students to *"internalise what they had learned, and assist their leap from the theory to the application of the theory, which is difficult at this young age."*

Students did discuss how they were often provided with the opportunity to interact with the knowledge involved through discussions. Sven explained how his teacher did not *"just write the concept for us to study. She attempts to involve us through discussion, especially by asking for our experiences. While I provide my opinion, I can also understand what my friends are thinking."* Isaac and Sergio argued that if they just read the notes in class without discussing them, most students would not understand: *"We need to discuss and understand through examples. This is much better than just reading the notes. Our teacher gives us the notes only after we have discussed them"* (Sergio). This aspect of cultivating discussions is consonant with Lambert and Biddulph (2015) who argue about the need for "creating spaces for genuine dialogue between students, their teachers and the discipline" (p.220). Through discussion, teachers attempted to explore and make sense of their students' experiences and, where possible, accompany them into new ways of thinking in the subject. This resonates with Bustin (2019) who argues that "it is not the everyday knowledge that is powerful, but how skilled teachers help students to make sense of their experience that gives it power" (p.177). Employing discussion to empower the students to develop the everyday knowledge they bring to the lesson is an element of expert teaching carried out by experienced teachers. It is a powerful pedagogical approach that cultivates a Future 3 curriculum by providing the students with the opportunity to engage with the disciplinary knowledge involved. One must be aware of discussions that may look engaging but which ultimately do not support disciplinary learning. An example would be an economics classroom where the students discuss topics without sufficient substantive and procedural knowledge. The discussion is likely to reproduce the students' everyday knowledge with little or no engagement with disciplinary knowledge in economics.

The data indicate that discussions assisted the teachers to elicit the economics knowledge involved. Teacher Susan mentioned attempting to *"bring out the content from the students as much as possible. Sometimes a comment opens up a mine of information."* One of her students, Luke, explained how *"from the discussion the teacher extrapolates the content. The best thing she then does is that from our input, she constructs a mind map on the whiteboard, discussing how our ideas can be refined."* A student from another class, Sergio, brought an example from the topic of international trade, outlining the teacher's reassuring attitude: *"She told us: 'Come on!*

What do you know about the advantages of foreign trade? What do you think?' And we started coming up with valid points." His teacher Mary narrated how she noted down on the whiteboard her students' contribution:

> *I never dismiss a contribution. I believe that whatever they say, I can link it in one way or another. I mark a very good symbol near the ideas that hit the nail on its head and a dot near those which're not so near. Never a cross. Then I build up.*

Experienced teachers like Mary considered incorrect answers as a source of information, and then followed them up in a respectful manner. This is an aspect of expert teaching which fostered a classroom environment conducive to participation and engagement with economics knowledge (see section 8.5). It calls to mind Stobart (2014) who argues that making mistakes needs to be perceived as productive and as part of the deliberate practice towards becoming an expert learner.

At the beginning of the economics course, students tended to be shy and refrained from participating in discussions. Teachers attempted to cultivate 'dialogic spaces' for their students, characterised by dialogue or conversation between the students and the teacher, and real-world events and the discipline of economics (Lambert and Biddulph, 2015). For example, Grace explained that it normally took three months in Year 9 until she got them *"to have a proper discussion. I work hard at the beginning to set this climate."* Another teacher, Stephen, explained that his students were aware that his *"yardstick is that they know how to discuss a concept."* He involved them in a gradual process of interacting with the economics knowledge involved: *"In Year 9 they get the marks if they study. In Year 10 the knowledge they contribute in class is half important. In Year 11 the knowledge they discuss is most important; in fact, the annual assessment includes an oral examination."* He explained how he created dialogic space during his lessons:

> *If we're discussing a concept, I expect them to argue, for instance: 'Currently in our roads there's that advert and I relate it to this topic in this way.' I often create the space which I call 'the man in the street' ideas where students discuss ideas and apply concepts from economics. … For example, they have a particular article from a newspaper, and they have to evaluate it. They have to bring in their own knowledge from economics and discuss the concepts involved.*

In a similar vein, teacher Robert argued that if economics was this subject that *"teaches how to understand, evaluate and discuss economic situations and experiences, then I should teach my students how to do so."* The arguments of Stephen and Robert call to mind Roberts (2014) when she argues that a powerful

pedagogy helps students to “make connections of all kinds: between existing knowledge and new ideas; between different pieces of information; between different concepts” (p.205). Students in these classes were provided with the opportunity to reflect upon and reconsider their existing knowledge and understanding in the light of what was presented and discussed in class. By reflecting upon and discussing their own knowledge and experiences, students could bring these aspects into their own current consciousness. Through discussion with others, they could compare and contrast their experiences with those of their peers, enabling them to become aware of the limitations of their own thinking and develop a different perspective. This pedagogical approach is powerful in that it could enable students to experience deep learning, resulting in “significant changes in capability or understanding” (Eraut, 1997, p.556). This resonates with Davies and Brant (2006) who argue that “teaching that does not change what students think is unlikely to have a lasting impact” (p.176) and with Stobart (2014) who claims that new learning makes a difference in how we think or perform.

There were instances where I felt that some teachers could have provided their students with more dialogic space for developing their own thinking about the issues being considered. For example, when teacher Susan was discussing the points inside the PPC, a student asked: *“When the government announces that unemployment has fallen, does it mean that the economy is approaching the curve?”* She immediately replied: *“Yes. We try to reduce underutilisation.”* She did not explore further his thinking. For instance, it was important to clarify that the model is a static one, depicting a world composed of two commodities. One possible explanation for her behaviour might be that she felt pressed into limiting discussions because of the pressure to cover the syllabus. This resonates with Spotton Visano (2018) who argues that teachers tend to resort to traditional teaching to cover more breadth of topics. The tendency to resort to traditional teaching exhibits aspects of Future 1 thinking. The issue of providing the students with dialogic space to help them engage more with powerful knowledge in economics needs to be raised explicitly in teacher education and teachers’ professional development. Students require the space for discussing their ideas so as to encourage their critical thinking and autonomy, help them engage with the subject’s knowledge, and offer a more pluralist economics education (section 2.4.5). These aspects nourish a Future 3 economics curriculum.

8.4.7 Questioning

My research data indicate that teachers employed the questioning technique to facilitate the process of discussion and the engagement with economics knowledge. Students noted how particular questions required a *"mental effort"* to analyse an economic scenario (Dwayne). Peter explained how at times their teacher asked them high level questions to consider *"a sort of case study of reality that helps to analyse the topic under consideration."* She would stimulate a discussion by asking them, for instance: *"If Malta experiences a recession, what's the best way to proceed?"* He liked this approach because the questions asked stimulated him *"to use the tools acquired during the lessons to evaluate and analyse an economic situation and propose solutions."* This pedagogic approach was powerful in that it tended to provide the students with the opportunity to engage with the disciplinary knowledge involved instead of being passive recipients as is the case in a Future 1 curriculum.

Teacher Antonia discussed that she would be *"just throwing away"* her knowledge if she did not involve her students in discussions through the use of the questioning technique. She explained how *"through questions I direct and facilitate the discussion and the students' learning the way I want."* For instance, when discussing the supply of labour, I observed her instigating her students' thinking by asking them: *"On what criteria shall you choose your employer when you become an employee?"* She frequently asked her students what they thought about the response of one of their classmates. She realised that when students challenged each other, *"they really learn. In economics there's ample room for doing that."* On another instance, I observed Antonia inviting a student to draw the demand and supply curves on the whiteboard:

Antonia: What do you notice on this graph?

Chris: That the demand and supply curves intersect.

Antonia: Can someone explain what's happening at the point where they intersect? What does it really mean?

Dassier: That producers and consumers have some agreement on the price.

Antonia: What do the others think?

Massimo: It's good for both consumers and suppliers.

Franklin: Optimum point for consumers and suppliers.

Antonia: What does the word 'optimum' mean?

Rita: The best for both consumers and suppliers.

Antonia: Why do you think it's the best?

George: It's not too expensive for consumers, and suppliers are happy with the amount of profit.

Antonia: We have a situation where the quantity demanded is exactly equal to the quantity supplied. Do you agree?

Students: Yes.

Antonia: We call the price at which they intersect as the equilibrium price. What does the word 'equilibrium' mean?

Students: Balance ... We've done it in physics.

Teacher Antonia attempted to use probing questions to involve her students into understanding the economics content involved. She tended however to re-inforce the dominant neoclassical economics paradigm. A static neoclassical model was presented, which students might had perceived to be the 'truth', as if it was real in itself, and not as a tool to assist them into exploring the unseen forces of demand and supply. It seems to me that this approach did not constitute powerful pedagogy in that it provided the students with a limited opportunity to challenge neoclassical content, and tended to nourish a Future 1 curriculum that treated knowledge and theories as largely given. Providing students with the opportunity to interrogate the models of neoclassical economics promotes a Future 3 curriculum.

Probing questions enabled the students to think further. When Christy was teaching the role of government expenditure, I observed a student remarking that it was better for the economy if there was an increase in government expenditure. Christy asked her students: *"Can we always say that it's better? What do the others think?"* A discussion ensued about the possible effects of an increase in government spending on the economy. When another teacher, Liberata, was discussing cost-benefit analysis, a student referred to his neighbours constructing a pool. She asked him: *"In what ways might this affect your family?"* She elicited the social costs and benefits involved. This was an opportunity of infusing values into static neoclassical economics content, illustrating the importance of teachers using brief and unplanned opportunities to animate the subject. These ethical considerations assist into bringing the social and moral elements back into economics.

The findings in this section 8.4 suggest that although teachers were presented with a curriculum dominated by the neoclassical economics paradigm (section 2.2), they did not perceive it as a static body of knowledge to be transmitted to their students so that

learning risked becoming the passive absorption of knowledge as in a Future 1 curriculum. They instead invested efforts in being innovative in their teaching strategies by adopting a pedagogy composed of student-centred approaches to teaching and learning that attempted to engage their students with the disciplinary knowledge involved.

8.5 A supportive classroom climate

A theme that recurs through the data is that a supportive classroom environment provided the groundwork for students to experience deep learning of disciplinary knowledge in economics. This climate was characterised by teachers investing efforts to get to know their students, fostering mutual respect, including everyone in learning, and cultivating relationships within a 'safe' learning environment. I observed teacher Mary, for example, cultivating a family atmosphere during her lessons by emphasising with her students: *"We're the economics group. We're one family. We're not numbers in class but persons."* Small groups of students were conducive to the creation of this environment characterised by respect. For instance, I observed Robert urging his students: *"We must respect and listen to each other, even if the answer appears to be wrong."* He was in agreement with four other teachers that students needed to be respected because they possessed life experiences which enriched the teaching and learning process. Teacher Ian considered a relationship of mutual respect as *"the most important ingredient to ensure learning."* Three other teachers claimed that if the students disliked their teacher, they would also dislike learning the subject. The theme of cultivating relationships to enhance learning calls to mind the argument of Lambert and Biddulph (2015) that by "forging productive relationships with young people", teachers can recognise their students' potential and prepare the groundwork for creating dialogic spaces where students can experience a meaningful encounter with disciplinary knowledge, and possibly be part of the curriculum-making process (p.220).

Teachers attempted to cultivate a classroom climate where students felt safe to contribute their experiences and participate in the process of learning disciplinary knowledge. *"Come on, don't be afraid to answer"*, I observed Liberata communicating to a student whom she was attempting to involve. When the students in her class were assigned to correct each others' worksheets during her lesson, I observed how harmoniously they provided feedback to each other. Three teachers, Mary, Grace and Liberata, argued that teaching the students the entire economics course assisted the

cultivation of this safe climate. Grace referred to *"a build-up"*, working hard during the first months of the course to establish a safe learning environment. But once created, *"it won't be a problem for them to participate. There may be times when they're afraid that they're going to say something stupid and others laugh at them. But then they realise that they can speak."* An affective climate conducive to learning disciplinary knowledge in economics was cultivated. Teacher Liberata referred to this classroom environment as a *"no stress classroom atmosphere"* where students were encouraged to take risks: *"They all risk something in class discussion. Otherwise, they won't be willing to participate and risk saying something which they might perceive as incorrect."* Student Kyle explained how during the lessons he *"often expresses his opinions about an issue or shares an experience. Sometimes in discussions we talk about our own personal lives. We trust each other and feel at ease to mention personal issues."* By being keen to develop this safe learning environment, teachers positioned their students better to engage with the disciplinary knowledge involved. This finding relating to the cultivation of a supportive classroom climate contributes to the literature relating to the affective component involved in the teaching and learning of threshold concepts and powerful knowledge, and support the assertion of Barradell (2013) that students need to be reassured and supported when their learning journey involves periods of conceptual difficulty. It is by giving due attention to "the emotional in classroom practice" that students are supported to savour the joy of learning disciplinary knowledge (Moore, 2004, p.34).

The data suggest that a sense of humour during the lessons contributed towards a safe classroom climate. Teacher Liberata argued that *"a touch of humour lightens up the lesson"*, facilitating her students' understanding. She claimed that this attitude calmed down and reassured those students who were about to panic because they were experiencing troublesome knowledge: *"I first joke with the student so that she doesn't feel inferior to others. Once she calms down, she has a better chance of understanding."* This finding relating to the use of humour to assist in the cultivation of a supportive learning environment concurs with Mizzi and Bartolo (2007) who discuss "the deliberate use of humour" by catechists in an informal learning environment to create a harmonious classroom climate (p.25), and with Stobart (2014) who refers to 'playfulness' in situations where learning is rigorous but experienced as a source of pleasure and satisfaction.

The findings in this section relating to the cultivation of a supportive classroom environment are consistent with the literature and research findings in the area of responding to student diversity (e.g., Mizzi, 2007, 2018, 2021b; Mizzi and Bartolo, 2007; Tomlinson, 2003, 2006, 2014; Turner-Bisset, 2001; Valiandes and Neophytou, 2017), emphasising the valuing of personal relationships and the cultivation of a safe classroom climate where students actively participate in their learning. However, I have not encountered this theme in the economics education literature (chapter two). The idea of cultivating a supportive classroom climate needs to be given more attention in economics education and in the research pertaining to learning disciplinary knowledge in school subjects.

8.6 Conclusion

In this chapter I have discussed pedagogical approaches that promoted the students' engagement with powerful knowledge in Maltese school economics. Teachers connected economics to real life, emphasised the process of reasoning economics knowledge, employed their specialist knowledge to develop PCK representations, and adopted a varied pedagogical repertoire. This powerful pedagogy tended to introduce the students into the realm of disciplinary knowledge in economics, providing them with the opportunity to acquire knowledge that was beyond their experience.

In the next concluding chapter I reflect about the research and its process, and discuss how the research questions have been answered, the limitations and ideas for further research, and the contribution to knowledge.

9. Conclusion

The first section of this final chapter presents a reflection on the research, its process, and the research questions. In section 9.2, the two primary research questions are addressed. Then I discuss my reflections on the implications arising from this research study. In section 9.4, I address the limitations of the study and my ideas for further research. I outline the contribution to knowledge of this thesis in the last section 9.5.

9.1 The research and its process

As a newly appointed teacher educator in business education at the University of Malta, my interest at the start of my six-year long PhD journey was on understanding better the enactment of the teaching and learning process in the business education subjects at secondary school level in Malta. These subjects consists of accounting, economics and business studies. My initial research question explored how the curriculum and learning are conceptualised and enacted in the Maltese secondary school business education classroom. This I felt could best be achieved by employing a qualitative methodology that explored the teaching and learning process through lesson observations and interviews with teachers and students. This mapping out and exploration of the business education field in Malta could contribute towards the literature pertaining to business education in Malta as no peer-reviewed research exists in this regard. During the first two years of my research journey I engaged with the ideas of threshold concepts (chapter three), powerful knowledge (section 4.1) and the teachers' specialist knowledge bases for teaching (section 4.2). These notions assisted me to understand better the teaching and learning process in business education.

During the third year of my PhD, I felt the need to focus my thesis on economics education in order to offer more depth. Economics education constitutes my core professional work as a teacher educator, and I wanted to make a case in favour of State school students having the opportunity to choose to study the subject. The theory of powerful knowledge was useful in this regard as it provided me with a theoretical lens to explore how and in what ways young people are empowered for their life journeys when they learn economics. The primary research questions underpinning my research study evolved as follows:

1. How does economics offer secondary school students powerful knowledge that enables them to think beyond their everyday experience?
2. How do teachers enact a curriculum underpinned by powerful knowledge?

These research questions were approached through a qualitative methodology where data from 14 lesson observation sessions and the views and opinions of 14 economics teachers and 20 Year 11 students were analysed using a thematic analysis that was guided by the conceptual framework that I have developed in chapter five relating to powerful knowledge and pedagogy in school economics. I kept myself aware of my positionality, reflecting upon the complex reality of what was experienced and represented by the different interpretations and perspectives provided by the teachers and the students.

A critical realist conceptual framework offered the opportunity to understand better the reality of the teaching and learning process in school economics. Throughout the research process, consistent with critical realism, I have attempted to reflexively be aware of the three domains of reality: the empirical, the actual and real (Bhaskar, 1979, 2017). The domain of the empirical can be perceived through experiences and observations. This is pertinent in the lived experiences evidenced in the interviews and in the lesson observations, and in the theoretical and philosophical state of economics and the economics education literature (discussed in chapter two). The domain of the actual is evidenced by the events experienced by the individual participants in the research and those persons involved in the literature I referenced. The domain of the real focuses on identifying the structures, powers, mechanisms and tendencies that influence the actual and the empirical domains, encouraging the reflexive practice of searching for the best explanations of reality. During the research process, for instance, I kept myself aware of the tendency of an implicit acceptance of theory from the dominant neoclassical economics school and the influence on the teaching and learning process in school economics. Teachers might not be aware that they may be steeped in this dominant school of economics, and might expect their students to accept economics knowledge as given, thus promoting a Future 1 curriculum. This tendency did manifest itself in school economics as a strict adherence to static neoclassical economic models, which were presented as entities in themselves instead of being taught as explanatory tools that assist the understanding of the unseen forces and mechanisms at work. This tendency precluded a deeper

understanding of reality and rendered economics learning dull. Keeping in mind the domain of the real assisted me to be aware of the tendencies and forces operating in the Maltese economics classroom. The research methodology adopted provided me with a useful structure in which to explore economics education at secondary school level in Malta, and proved helpful to support my efforts in understanding better school economics in my role as a teacher educator.

9.2 Answering the research questions

At this juncture of the chapter, I address the two primary research questions. What began as a desire to understand teaching and learning in business education, developed into a conceptualisation of powerful knowledge and pedagogy in Maltese secondary school economics.

9.2.1 Research question 1: Powerful knowledge in Maltese school economics

The first research question has been chosen to explore what constitutes powerful disciplinary knowledge in Maltese school economics that empowered students with knowledge that took them beyond their everyday knowledge and experiences. I start to address this research question in chapter five where I bring together the literature review chapters (chapters two, three and four) to conceptualise the aspects of powerful disciplinary knowledge in school economics and how a Future 3 economics curriculum might look like. By drawing upon research that identifies powerful knowledge in other school subjects, I explore the implications to the case of school economics regarding the economic concepts and forms of economics knowledge that might be regarded as powerful according to Young's definition of powerful knowledge. In so doing I develop a framework that conceptualises powerful knowledge in school economics (Figure 9).

In this framework I argue that powerful knowledge in school economics can be conceptualised as consisting of two components or types. The first type of powerful knowledge is discipline based, theoretical knowledge that is developed by economic experts within an epistemic community that enables the students to think and discuss economic issues in a new and more well-informed way. This knowledge is acquired when the students grasp the threshold concepts of opportunity cost, price formation through the interaction between markets, marginality and general equilibrium. The second type of powerful knowledge is conceptualised as deriving from the first type of

powerful knowledge and provides students with the intellectual ability to analyse, explain, predict, evaluate and think about the economic world in ways that are beyond their personal experience. In particular, school economics is perceived to empower students to understand better the economic world around them, equips them with new ways of thinking about the economic world, and enhances their criticality of thought in economic issues and their participation in economic debates. The conceptualisation of powerful knowledge in secondary school economics education argued for by this thesis therefore blends together the substantive knowledge and the aspects of economics thinking to generate powerful disciplinary knowledge in economics.

This framework conceptualising powerful knowledge in school economics assisted my interpretation and conceptualisation of the data collected from the lesson observations and the interviews. As regard the first type of knowledge, the findings identify scarcity, choice, opportunity cost, marginality, demand and supply analysis, and market structures as concepts that the students needed to grasp in order to progress in their learning (section 7.1). This thesis argues that these are concepts in Maltese school economics that meet the epistemic criteria established by powerful knowledge by enabling the students access to critical ways of thinking about the economic world which transform their perceptions and behaviour, enabling their agency and capability to think in the subject. These are aspects of a Future 3 economics curriculum which is characterised by the engagement with powerful knowledge. The findings emphasise the concepts of scarcity and choice which are not included in the framework presented in chapter five. It appears that teachers emphasised these concepts to ensure that their young students grasped the concept of opportunity cost that emerges from the notions of scarcity and choice. The concept of general equilibrium which is highlighted as a threshold concept by the framework does not feature in the data collected. Prominence was given to the concept of opportunity cost; it was considered as powerful by the teachers in that their students were equipped with an analytical tool that provided them with the opportunity to develop their thinking and agency, enabling them to make more informed decisions as consumers, citizens and workers (section 7.3.1).

As regard the second way of conceiving powerful knowledge in Maltese school economics, the findings in chapter seven confirm the three expressions of powerful knowledge put forward by the conceptual framework for powerful knowledge in

economics (Figure 9). The forms of powerful knowledge consist of the knowledge that enables the students a deeper understanding of the economic world around them, knowledge that equips young people with new ways of economic thinking, and knowledge that develops the students' criticality of thought in economic issues and their participation in economic debates. The findings from the data do enrich the framework by adding depth to each expression of powerful knowledge. These expressions are summarised in Figure 12; a brief discussion on each expression then follows.

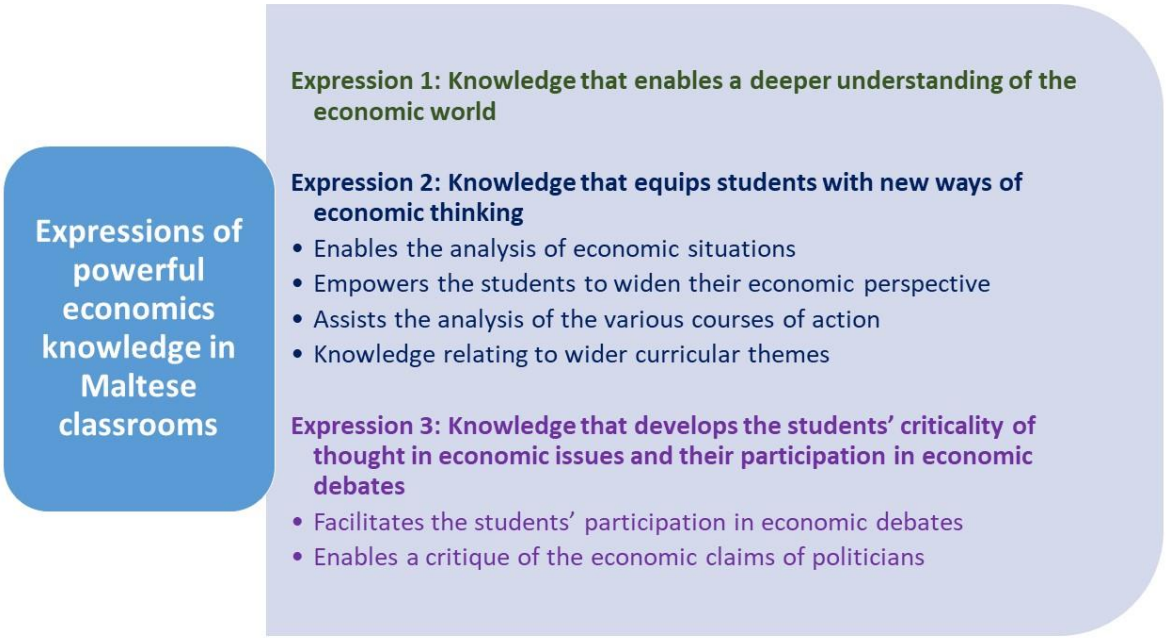

Figure 12. Expressions of powerful knowledge in Maltese school economics

The first form of powerful knowledge conceptualised by this thesis is the knowledge that matures students in economic literacy, being the ability to explore, understand and discuss events that occur in the economic environment. The findings suggest that by enabling the students with a deeper understanding of the economic world, economics education provided them with the agency to make more informed choices as consumers, citizens and workers. This is a form of powerful knowledge that the discipline offered, providing young people with a distinctive economic lens that enabled them with a more mature understanding of the world that was beyond their personal knowledge and experiences. This thesis argues that by exposing the students to economic ideas outside their immediacy in the economic world around them, young people can broaden their perspectives about the economic issues

discussed, providing them with the opportunity to gain access to knowledge with which they are not familiar, and develop an awareness of observing and analysing what is going on in the economic environment around them. The latter aspect was regarded by some teachers as an important element of an educated person.

The second type of powerful knowledge conceptualised by this research study is the knowledge that provides students with agency by enabling them with critical ways of analysing and explaining economic situations. The data analysis in chapter seven (section 7.3) argues that this form of powerful knowledge in Maltese school economics can be perceived as consisting of four other expressions: knowledge that enables the students to analyse economic situations, knowledge that empowers the students to widen their economic perspectives, knowledge that assists the analysis of the various courses of action, and knowledge relating to wider curricular themes such as education for creativity, entrepreneurship, critical financial literacy, and citizenship education. My argument is that the economic literacy acquired by students through learning economics is a form of powerful knowledge that cultivated an active economic citizenship where young people were provided with a sense of agency by helping them to consider alternative perspectives and courses of action, be aware of the implications of one choice over another, and the impacts of their decisions on other persons, the society, the economy and the environment. Grasping disciplinary knowledge in economics can transform the student's way of thinking, in that the individual starts to critically analyse economic situations and think in the subject. These are key purposes of educating in economics which promote a Future 3 economics curriculum.

The third form of powerful knowledge articulated by this thesis is the knowledge that enhances the students' criticality of thought in arguing about economic issues. Following the data analysis, this expression of powerful knowledge evolved to include the knowledge that facilitates the students' participation in economic debates, and the knowledge that enables them to critique the economic claims of politicians, policy makers and persons in authority positions. School economics empowered the students with the analytical tools to think about, analyse, evaluate, and argue about economic arguments, thus cultivating their ability to make informed choices as citizens and potential voters. They were provided with the opportunity to acquire a sense of agency by researching what was really occurring in the economy, and critically judging

issues by applying concepts from economics. These are relevant aspects of a Future 3 approach to economics education.

The original contribution to new knowledge that this study makes is the articulation of what powerful knowledge might look like in school economics (Figure 9) and how it looks like in Maltese school economics (Figure 13). Powerful knowledge in Maltese school economics is conceived as arising from the blending of the economics knowledge arising from the grasping of threshold concepts with the expressions of disciplinary thinking in terms of the powers or capabilities that this knowledge would give to the students who possess it. The next section 9.2.3 discusses another unique contribution that is made by this research: the articulation of powerful pedagogy in Maltese school economics.

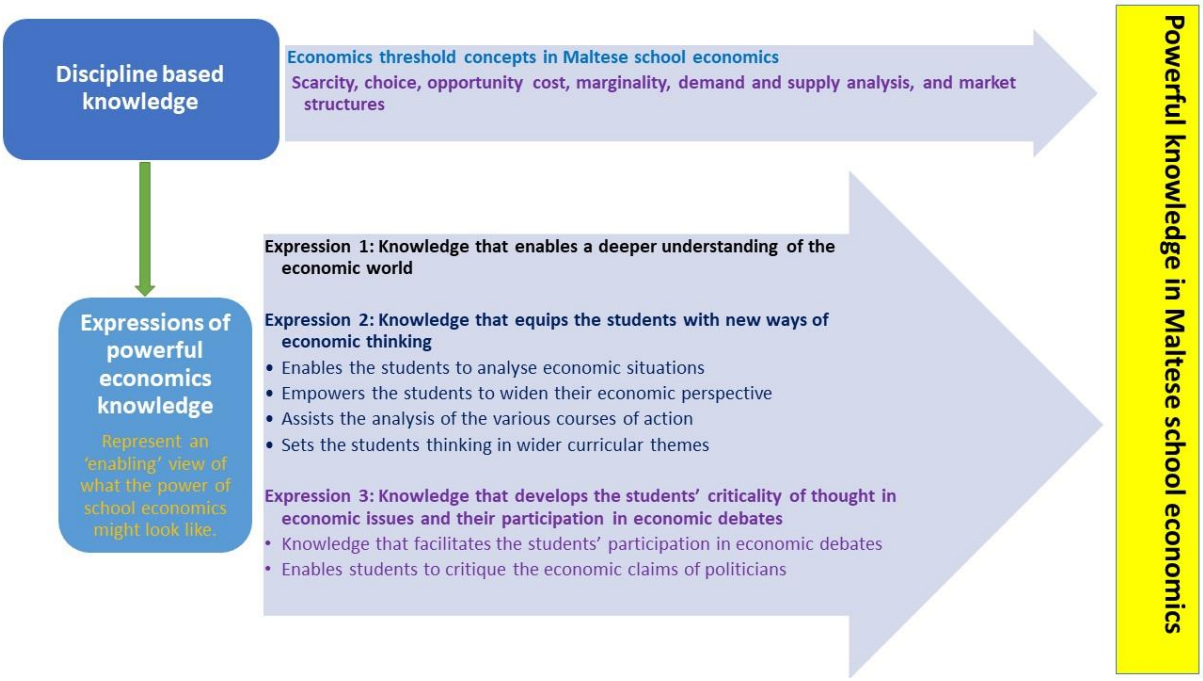

Figure 13. Powerful knowledge in Maltese secondary school economics

9.2.3 Research question 2: Powerful pedagogy in Maltese school economics

The second research question explored the pedagogical aspects of powerful knowledge – the teachers' efforts at enacting a curriculum underpinned by powerful disciplinary knowledge in economics. The findings in chapter eight indicate that pedagogical approaches that introduced Maltese secondary school students into the realm of disciplinary knowledge in economics consisted of emphasising the process of reasoning, connecting economics knowledge to real life, employing the teachers'

specialist knowledge to develop PCK representations, and adopting a variety of teaching strategies.

The nature of the summative assessments in Maltese school economics tended to influence many students to study the economics content by heart. The data sources suggest that to alleviate this problem most teachers emphasised the process of reasoning to get their students engaged with the economics knowledge involved. This pedagogical approach required the students' active engagement with disciplinary knowledge in a Future 3 economics curriculum, fostering deep learning, thinking in the subject, and better results in examinations.

In order to facilitate their students' encounter and engagement with economic concepts, teachers attempted to connect school economics to real life by discussing examples from their own life, their students' experiences, and the world around them, and gradually accompanied them into a deeper understanding of the concepts involved. This pedagogical approach of bringing in real-life examples facilitated the students' engagement with the disciplinary knowledge involved by contextualising and incarnating economics in the local, national and international contexts. This approach involves a departure from a Future 1 economics curriculum associated with a one-way transmission pedagogy to an attempt at assisting the students to engage with the disciplinary economics knowledge involved. This pedagogical approach of valuing and employing everyday knowledge and real-life experiences tended to explore and make sense of real-world experiences, transform the disciplinary knowledge involved in such a way as to be relevant to the students, provide them with a better understanding of the economic world around them, and accompany them into new ways of thinking in the subject. These are relevant aspects that nurture a Future 3 economics curriculum.

This research study supports the argument that whilst the subject is situated at the centre of the curriculum and pedagogy, real-life knowledge and experiences become 'the co-core' (Catling and Martin, 2011), representing another form of valuable powerful knowledge which needs to be taken into consideration during the teaching and learning process. The findings suggest that students were offered the opportunity for dialogue between the economics content and real-life experiences. For instance, they were provided with the opportunity to reconsider their existing knowledge and understanding in the light of the economics knowledge learned, growing aware of the limitations of their own thinking and developing a different way of perceiving issues.

This pedagogical approach of discussing examples from the real-world scenario to assist the exploration of the disciplinary knowledge involved supports the adoption of ‘a back-to-front’ approach which first explores reality and then presents economic theories not as dogmas to be accepted unquestionably but as explanatory tools that aid the understanding of the economic forces, structures, tendencies and mechanisms at work. Economic models and theories are presented as predicated on reality and taught as an explanatory device that assist the understanding of the economic world. This powerful pedagogical approach promotes a Future 3 economics curriculum where teachers cultivate dialogic spaces for students to develop their own economic thinking characterised by the interactions between the students, the teacher, real-world events, and the discipline of economics.

The findings indicate that another powerful pedagogical approach that most teachers adopted was to draw upon their own specialist knowledge to develop a variety of PCK representations in order to facilitate a meaningful engagement between their students and the disciplinary knowledge in economics, making economics content accessible and enacting it in a manner as to make the subject relevant and worth studying. During the enactment of these representations, there was evidence that the various professional knowledge bases of the teachers blended together with the prescribed economics curriculum to produce PCK that assisted the students’ engagement with disciplinary knowledge in a Future 3 economics curriculum. The thesis argues that the curriculum cannot be separated from the pedagogy, refuting the dichotomisation suggested by the notion of powerful knowledge that considerations relating to ‘what to teach’ can be separated from those dealing with ‘how to teach’.

Teachers are faced with a prescribed syllabus dominated by the neoclassical economics paradigm (section 2.2). The findings indicate that most of them, however, did not perceive it as a static body of knowledge to be transmitted in such a manner that their students became passive recipients as is the case in a Future 1 curriculum. They instead thought hard how to develop a variety of teaching strategies composed of student-centred approaches to teaching and learning that tended to provide epistemic access. The data suggest that the pedagogical approach of infusing a variety of teaching strategies in their lessons was considered by the teachers as an important element of expert teaching that could engage their students at a deep level with the economic concepts involved. The teaching strategies identified included

activities, games, mind maps, role plays, drama, discussions, group work, case studies, and the use of questioning. While using these pedagogical tools, teachers paid attention so that these strategies not just enlivened the lessons but engaged their students with the disciplinary knowledge in economics. The findings indicate that these pedagogical tools provided the students with the opportunity to understand at a deep level the disciplinary knowledge involved, engage in higher order thinking in economics, broaden their economic perspectives and awareness of the economic scenario, apply concepts to acquire a nuanced understanding of economic situations, make judgments, and propose and discuss economic courses of action. These are important aspects of a Future 3 economics curriculum.

A theme that recurs through the data is that the cultivation of a supportive classroom climate prepared the groundwork for the enactment of the pedagogical approaches that enabled the students to start to think in the subject. This climate was characterised by teachers investing efforts to cultivate relationships within a safe learning environment, fostering mutual respect, attempting to include everyone in the learning process, and supporting their students' learning journey when it involved periods of conceptual difficulty.

9.2.3 A Future 3 curriculum in Maltese school economics

This thesis conceptualises a Future 3 economics curriculum in Maltese classrooms as underpinned by disciplinary knowledge in economics and powerful pedagogical approaches that empowered the students to start to think in the subject and perceive the world through an economic lens. Figure 14 illustrates the elements that characterise this Future 3 curriculum. The diagram builds upon the conceptual framework presented in chapter five (Figure 11) that perceives curriculum making in secondary school economics as the interaction between the three dimensions of the students, the secondary school economics curriculum and the pedagogy.

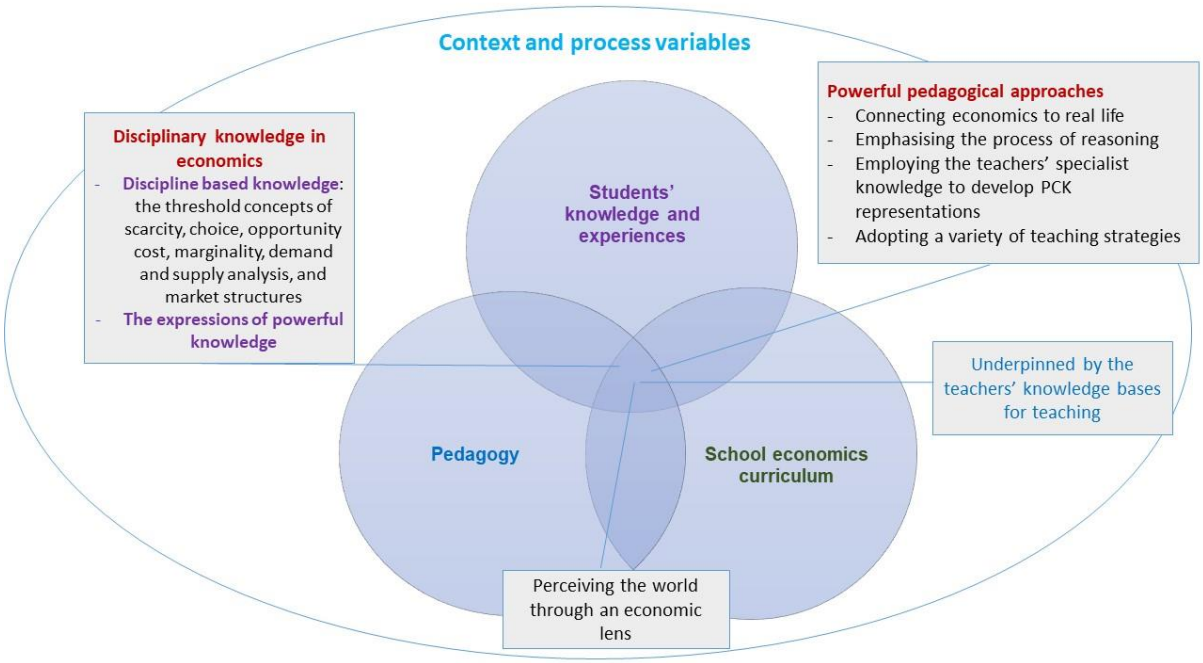

Figure 14. A Future 3 curriculum in Maltese secondary school economics

The next section discusses considerations relating to the enactment of a Future 3 economics curriculum.

9.3 Reflections on the implications

The answers to the first primary research question indicate that powerful disciplinary knowledge in economics empowered the students in the Maltese Church and Independent schools with knowledge that developed their capabilities and sense of agency to think about the economic world in ways that were not possible before the development of this knowledge. This disciplinary knowledge involves expressions of powerful knowledge that young people may only experience if they study the subject. This thesis argues that all students including those attending the Maltese State schools are entitled to the disciplinary knowledge in economics that takes them beyond their knowledge and experiences.

Prioritising upon cultivating a Future 3 economics curriculum requires teachers to perceive themselves as curriculum leaders with the responsibility for enacting the curriculum. This implies the investment of more time and resources on their own professional development that engages them more with conceptual discussions about the subject, identify the ways in which the disciplinary knowledge in economics is powerful for young people, how the curriculum is experienced by the students, exploring pedagogical approaches that are appropriate for the acquisition of

disciplinary knowledge, and collaborating with other persons who work with powerful knowledge in economics such as academics. The collaboration between academics in universities, teachers in schools and their students as networked epistemic communities facilitates the development and dissemination of subject expertise between the sites of knowledge production in universities and teachers in schools (Chapman 2021; Young, 2021).

The enactment of a Future 3 economics curriculum implies the need for teachers to become aware of any grips of the dominant economics paradigm. They may unknowingly be immersed in their own neoclassical experience of economics and may be difficult for them to perceive alternative conceptualisations to the organisation and working of the economy. It helps if they are aware, for instance, of the temptation to teach models as being predictive, or when a heavy reliance upon these models leads to the side-lining of important issues such as the distribution of wealth and other values. Being knowledgeable about the history and the schools of economic thought is useful in this regard as it can help teachers to be more aware of the hegemony of the neoclassical economics paradigm. For instance, it would be beneficial for a teacher to often ask such questions as: “Am I indoctrinating my students into a neoliberal way of organising society? Am I ignoring any motives for choice and action that fall outside the behaviour set up in the economic model I am presenting?” These and other questions assists teachers to educate their students in the third form of powerful knowledge: knowledge the develops the students’ criticality of thought in economic issues and their participation in economic debates. In this respect, it would be useful for the promotion of a Future 3 economics curriculum if teachers sensitise their students about the various schools of economic thought. Such a pluralist pedagogical approach would cultivate in their students a critical awareness about the economics knowledge being considered. They would have the opportunity to reflect why the disciplinary knowledge gets moulded the way it does and how a particular school of economic thought gained a dominant status in economics.

Adopting a Future 3 economics curriculum as a goal to work towards requires teachers who are able to carefully plan and enact lessons that are underpinned by powerful knowledge. This implies a responsibility of ensuring high-quality teacher education. Potential teachers for economics classes need to be able and confident in enacting an enticing curriculum that inducts their students to start to think in the subject and take

on agency in contributing to changing the world in which they live. These teachers need to be specialists in the discipline and experts who prioritise upon careful curriculum making that involves powerful pedagogical approaches that engage their students with powerful knowledge.

The findings of this study indicate that to enable deep learning in a Future 3 economics curriculum rich in disciplinary knowledge requires the investment in time and effort in pedagogical approaches that provide epistemic access. Teachers need to draw on their professional knowledge bases, understanding and skill to generate a pedagogy which is necessary for the realisation of powerful knowledge in the classroom. One pedagogical approach argued for by this research is that of first exploring reality and then using economic theory as an explanatory tool. Another approach involves the valuing of the students' everyday knowledge and experiences and their social and cultural capital as forms of powerful knowledge that need to be considered and utilised during the teaching and learning process. The data suggest that the cultivation of the affective domain within the context of a supportive classroom climate prepares the groundwork for students to start experiencing deep learning. I have not encountered this aspect in the literature relating to economics education and powerful knowledge. Another aspect related to pedagogy that needs to be considered by teachers is for them to make explicit and celebrate their existing knowledge bases for teaching. In the course of celebrating this richness, they may reflect more about their own specialist classroom knowledge that may be facilitating their students' engagement with disciplinary knowledge.

This thesis argues that an important element of a Future 3 economics curriculum is the infusion of the moral and ethical dimension into the teaching and learning process. The infusion of values empowers the students to conceive in the discipline its moral and social purposes by perceiving individuals conducting their economic behaviour whilst fostering values and being compassionate towards other human beings. It is beneficial that this dimension is raised explicitly with teachers so that they are more aware of its importance. It is good practice, for instance, if teachers often ask themselves such questions as: "How am I regarding the human person in my economics teaching, as a homo economicus? Which values need to be included in the neoclassical theory I am asking my students to consider?" The Catholic context within which these teachers were teaching was conducive for them to infuse values in their

economics teaching. Since neoclassical economics claims to be value-free (section 2.1.6), the infusion of elements pertaining to the ethical and moral dimension when teaching the prescribed neoclassical syllabus is commendable in that it necessitates a move away from teaching a mechanical and amoral subject (a Future 1 approach) to one that is infused with values and concerned how to make the world a better place. If economics is introduced as a subject in the State secondary schools, the teaching and learning process will be enriched if it is infused with values in a manner similar to how it was being taught in the Church schools. Further research in this area would shed more light about the process of infusing values into economics teaching and learning.

9.4 Limitations and ideas for further research

Regardless of how much care I invested during the data analysis, the themes and the conclusions of this study are, ultimately, a reflection of how I interpreted the results. Different researchers may interpret the data differently. This might depend, for example, on their positionality. I dealt with this issue to the best of my ability by ensuring immersion in the data, being rigourous during the data analysis process to grasp the thoughts of the participants, and being explicit in identifying any potential researcher bias.

I am aware that other researchers may propose other visions of what may constitute powerful knowledge in school economics. Ideas about what powerful knowledge in a subject may look like are debateable, and there will often remain scope for strengthening and refining conceptualisations (e.g., Chapman 2021a, b; Kitson, 2021). Further research can contribute in these directions. It may include studies adopting a methodological approach similar to my own that are conducted in other countries or research with a more experimental methodology.

Some interviewed teachers commented about educating their students into considering the sustainable use of resources. This is noteworthy because school economics tends to be taught as if void of values, as neoclassical economics claims to be. There is going to be a syllabus change that comes into effect as from scholastic year 2022-2023 that introduces a number of sustainable development goals (SDGs) in the prescribed content. Further research can explore how teachers can infuse sustainability in their economics teaching and learning to sensitise their students about

their responsibility of caring for the planet's resources. This research can contribute insights relating to this aspect of enabling students with new ways of economic thinking that incorporate better sustainability values into the economic system.

Further research can be carried out within the broad area of secondary school economics education. Potential studies, for example, can research more extensively the students' voices relating to economics threshold concepts and their experiences with liminality.

9.5 Contribution to knowledge

The understanding of how learning progresses in the business education subjects is informed by a small body of evidence (e.g., Davies and Brant, 2006; Shanks, 2020); "more systematic evidence" is needed (Davies and Brant, 2006, p.1). This research contributes to the empirical research in economics education at secondary school level, especially by drawing upon evidence collected from different sources. In particular, this thesis contributes to knowledge by extending the theory of powerful knowledge to the subject of school economics by responding to the need of articulating the nature of powerful knowledge and pedagogy that are key elements of a Future 3 economics curriculum. I have encountered no peer-reviewed research in this regard conducted in school economics. My research can instigate further much-needed discussion about what constitutes powerful knowledge and pedagogy in economics and in the other business education subjects. Although the concept of powerful knowledge has "gained considerable attention in recent years, the pedagogical aspects of powerful knowledge have been less explored than its knowledge theorization" (Puustinen and Khawaja, 2021, p.16). This thesis contributes towards this latter aspect by identifying pedagogical practices that enabled epistemic access to the discipline of economics.

By identifying what makes school economics powerful for young people, this thesis makes an argument for the subject's inclusion in a school's curriculum. In particular, this research argues for the introduction of economics in the Maltese State secondary schools (as is available to students in the Independent and the Church schools). Students attending Maltese State schools are entitled to an education that enables them access to economics knowledge that is empowering in developing their capabilities and agency to make informed choices when they reach their adult lives.

Since the concept of powerful knowledge in economics identifies the types or expressions of economics knowledge that contribute to the development of the intellectual powers or capabilities of students, it can help address the challenge of communicating the educational value of learning economics to those persons who are not in the discipline. These include prospective students, policy makers and education administrators who make decisions about the subject. For instance, the expressions of powerful knowledge (Figure 12) can support the proposals to education administrators responsible for the school curriculum to acknowledge economics as powerful disciplinary knowledge and introduce the subject in the Maltese State schools and elsewhere where the opportunity to study economics is not available to young people. The theory of powerful knowledge is powerful in addressing the challenge of communicating the educational benefits of grasping knowledge that pertains to the discipline of economics and is therefore not learned in the other subjects.

Since some knowledge encounters tend to be emotionally charged, this thesis calls for the cultivation of a supportive classroom climate in preparing the groundwork for the students' encounter and engagement with disciplinary knowledge. This finding contributes to the paucity of research evidence in the area relating to the affective dimension involved in learning disciplinary knowledge and threshold concepts acquisition. With regard to the latter, this study contributes to a consideration of threshold concepts in school economics. Research in these constructs has mostly been undertaken in higher education disciplines (e.g., Land et al., 2016; Meyer and Land, 2006); I have encountered no peer-reviewed work researching threshold concepts in the secondary school economics classroom.

This study contributes by including the students' voices about their learning experiences in economics. Much of the work on powerful knowledge and threshold concepts has been from the perspective of teachers. There exists the need for research that focuses on teaching and learning as experienced by the students themselves (e.g., Lambert, 2018a; Land et al., 2016; White et al., 2016). Including students as co-enquirers into the nature of powerful knowledge and pedagogy in relation to their own learning experiences provides valuable insights to the teaching and learning process.

Finally, the original contribution to knowledge that this thesis makes is knowledge arising from the application of the theory of powerful knowledge to the specific case of

school economics. This study is original because it is the first attempt at articulating what constitutes powerful knowledge and pedagogy in this school subject. This research fills the gap by providing a vision for a Future 3 economics curriculum that has the potential to offer students access to disciplinary knowledge that develops their human powers, capabilities and agency. This epistemic access implies that all young people are entitled to avail themselves of the opportunity to study economics to foster their human development and flourishing.

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Appendices

Appendix I: Teacher interview schedule

This guides the discussion aimed at eliciting data to answer the following two primary research questions (RQs):

1. How does economics offer secondary school students powerful knowledge that enables them to think beyond their everyday knowledge and experience?

2. How do teachers enact a curriculum underpinned by powerful knowledge?

Rationale

The teacher interview schedule identifies which research question is intended to be addressed by each question asked. The aim of the first question is to warm up the discussion, especially by the teacher introducing himself/herself in regard to the subject/s and students taught. The second question explores the first research question by discussing how teaching economics contributes to the education of young people, the core concepts taught, and in what way/s do the teaching and learning of this subject enhance the understanding of economics beyond the everyday experience of students. The third question enables data to be collected addressing the second research question. It relates to broad approaches to teaching and learning concepts in economics. The researcher inquires about particular teaching approaches and strategies which the teacher has experienced as useful in teaching the economic concepts involved and which supported the students' learning.

Whilst the previous question is quite broad, question four is more specific in that the teacher is asked to discuss examples of concepts s/he taught which s/he feels that the students have really understood. It is intended that the ensuing discussion generates data that is directly relevant to both research questions. Depending on the response, probing questions follow to help the researcher investigate further. These consist of questions relating to providing answers to the first research question (questions 4a – g), and other three probing questions (questions h – j) relating to the second research question. The latter explore the pedagogy the teacher uses to teach these concepts, how is the content sequenced, how is the students' learning assisted, and how is enthusiasm and motivation generated and maintained.

Interview questions

1. *An introduction:*

a) Which year/s do you teach (Year 9, 10 and/or 11)?

b) Do you teach other subjects? Which one do you prefer teaching? Why?

2. *Relating to RQ1:*

a) How and in what ways do you think that the teaching and learning of economics contributes to the education of young people and enhances their understanding beyond their everyday experiences? Please give examples from your experience.

b) According to you, what are the core concepts in economics?

c) How do you professionally interact with the content you teach? Do you have any opportunities?

3. *Relating to RQ2:*

Can you please discuss particular teaching approaches related to particular lessons you have taught?

a) What are your favourite topics to teach? Why so? How do you get your students hooked? How do you teach these topics?

b) What are the topics you find difficult to teach? How do you get students to respond and learn?

c) Which teaching strategies and/or approaches do you feel support students' learning and you find most useful to teach the economic concepts?

d) From your experience, what motivates students to learn economics topics?

4. Have you ever taught a concept and you have really found that your students have learned? *This question relates to specific concepts that have been taught.*

Depending on the response I may probe further with questions relating to RQ1 such as:

a) What was the content about? What was the key concept to be learned?

b) How did you select what to teach (if you had some liberty to do so)?

c) To what extent was the concept learned? What evidence was there? How did the students' learning progress?

d) In what way/s were the students' prior experience and knowledge accessed and taken into account?

e) How was concept made accessible to them? What opportunities were they provided with to interact with the content? How did they react?

f) How did the concept and/or theme contribute to the wider curriculum aims?

g) *A question relating to students thinking in the subject:* Have you ever experienced students being immersed in the subject? What did you do from your end to achieve this?

Probing questions relating to RQ2:

h) What do you think helped and assisted students' learning? What pedagogy was useful in this regard?

i) What have you 'orchestrated' to generate enthusiasm and motivation towards learning?

j) How was the content sequenced?

5. Do you have any ideas or recommendations about the teaching and learning of economics?

Thank you for being generous in your time.

Appendix II: Student focus group interview schedule

This schedule guides the discussion addressing the following two primary research questions (RQs):

1. How does economics offer secondary school students powerful knowledge that enables them to think beyond their everyday knowledge and experience?

2. How do teachers enact a curriculum underpinned by powerful knowledge?

Rationale

The first two introductory questions aim to start up the discussion. Students are asked about the reason/s why they have chosen to study economics, their motivation to learn it, what economics knowledge they feel is important that they acquire from their school experiences, and about those aspects of the subject they like best and least.

The third question provides answers to the first research question by trying to uncover what the students identify as the key concepts in economics that according to them define the subject.

Question four aims to provide more answers to the first research question by investigating how and in what ways the students' learning in economics is relevant to their daily life and experiences.

Questions five and six are two relatively more open questions which provide the students with the avenue to discuss a topic they like most and how they think that the learning acquired through this topic enables them to think beyond their everyday experience. Such data collected provides answers to the first research question. During this discussion, data is collected about approaches and methods which have helped the students to learn the material involved. This provides answers to the second research question regarding pedagogies that provide students access and support to powerful economics knowledge.

Interview questions

1. Why are you studying economics? What motivates you to learn?

2. Which parts of economics do you like best? Why? Which bits do you like least? Why?

3. What are the key concepts in economics that you need to know that define the subject? *An attempt to relate to 'powerful knowledge' without using this expression.*

4. In what way/s do you think that what you are learning in economics is going to be useful in your life?

Does it help you or does it hinder you? Why?

Does it relate to your daily life and experiences?

In what way/s do you think this learning has enriched you?

5. a) What do you like most so far about your subject? Why so?

Back-up questions for further prompting if discussion halts:

Any particular topic that you liked most? How and in what ways do you think has this topic contributed to your formation? Did it relate to your daily life and experience?

Which approaches/methods do you feel helped you to learn the material involved? Which ones have been effective to help you learn?

b) Which topics did you find difficult to learn? Why?

6. Let us think about a topic you have already covered in class. Which topic do you want to talk about?

Listen to the students and together decide to discuss a particular topic.

Tell me about it. What did you learn about it? How has your thinking changed?

Back-up questions:

How do you know that you have learned?

What did you like most?

What do you appreciate most out of this learning?

How did the teacher go about the lesson? How did s/he support your learning?

Did you have the opportunity to show what you have learned?

7. Are there any recommendations for your teachers to make learning more relevant to you?

Thank you so much.

Appendix III: Observation schedule

The questions guiding the lesson observations aim to address the two primary research questions:

1. How and in what ways does economics offer secondary school students powerful knowledge?

2. How do teachers enact a curriculum underpinned by powerful knowledge?

Rationale

These observation guidelines have been developed from the literature to serve as a loose framework for the observation of the practices, behaviours, relationships and beliefs relating to powerful knowledge in economics. The first set of guidelines address the first research question, while the second set focus the researcher's attention to identifying data that answers the second research question.

Observation guidelines

1. How and in what ways does economics offer secondary school students powerful knowledge?

What is the curriculum content intended to be taught and actually covered in this class? What are the key concepts?

Where is the powerful knowledge relating to economics?

What evidence is there that the students have learned? Which content has been easy to understand and other content which the students have struggled with? Why? What evidence?

In what sense is this lesson (or this sequence of lessons) helping students acquire powerful disciplinary knowledge?

What are the ways in which economics thinking deepens or extends students' understanding?

How have the knowledge content of the lesson(s) been selected, organised and sequenced?

In what ways have the students been engaged conceptually with learning materials?

In what ways have students been helped to think in the subject?

Is there evidence of a curriculum of ‘engagement’ in class?

How does this economics content contribute to the wider curriculum aims?

2. How do teachers enact a curriculum underpinned by powerful knowledge?

How has the teacher attempted to generate enthusiasm and motivation towards learning?

In what ways are the content and concepts presented and made accessible to the students? How is the content sequenced? How is this justified?

In what ways has the teacher supplied data for students to assimilate, process, transform and communicate?

How does the teacher lead the learning? How does the lesson and students’ learning progress?

In what ways are the students’ prior experience/knowledge accessed and taken into account?

In what ways are students challenged to think beyond their current (or everyday) understandings?

What teaching approaches and pedagogy have helped the students to learn? Which ones haven’t been successful in this regard?

What is the response of the students to these teaching approaches?

How do you feel the learning environment in this classroom? Is it one characterized by motivation towards learning the subject?

What is the operation and the tone of the classroom? How do the students feel about their learning?