RESEARCH ARTICLE:

Creating Knowledge and Knowers in the Undergraduate Curriculum

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Abstract

This paper draws on concepts from the field known as the sociology of knowledge to identify the challenges involved in introducing research in the undergraduate curriculum. It begins by using Bernstein's (2000) 'pedagogic device' to conceptualise the introduction of research as a movement from the field of reproduction to the field of production with profound implications for who students must 'be' to engage with research as well as for classroom practices and course design more generally. It then moves to using the tool of specialization from Maton's (2014) Legitimation Code Theory (LCT) to go one step further in exploring students as researchers.

Keywords: knowledge; knowers; Legitimation Code Theory

Introduction

The relationship between knowledge and higher education is seemingly simple, yet deceptively complex. On the one hand, students enter the university to complete a programme that will provide them with the knowledge, skills, and practices to engage in the world of work, and they receive a qualification certifying their achievements in this endeavour. On the other hand, a university is a place of knowledge creation tasked with contributing to our understanding of the world and assisting us in addressing the many problems that beset people and the planet. While there is myriad of other functions that a university can serve, these two are arguably the most dominant and many universities grapple with the potential tensions between them. Understanding the relationship between knowledge and higher education mainly in terms of workplace readiness and accreditation brings several significant consequences for students. In an era in which graduates enter a rapidly changing world, it is likely that many of the workplace skills in which they have been trained will be redundant by the time they enter the labour market (Wheelahan, 2010), an observation made even more pertinent in the context of discussion about the Fourth Industrial Revolution (4IR) (Schwab, 2017). For thinkers such as Wheelahan (2010) and Allais (2013), without a deep understanding of the principled knowledge underpinning the skills and practices taught in the curriculum, students will be ill-placed to engage with the rapid change and solve the problems they will encounter as they enter the world of work.

Gamble (2006) provides an example of what this could mean in practice by pointing out that, in the past, apprentice mechanics learned by dismantling and reassembling engines and machines. In doing this they developed an understanding of the principles on which engines and machines worked, which allowed them to go on and solve problems when these engines and machines malfunctioned. Nowadays, engines and machines tend to be constructed with components in the form of sealed units which cannot be opened. As a result, technicians need an understanding of scientific and mathematical principles to apply logic and work out how a particular component functions in a larger assembly. A curriculum with a focus on skills may not pay sufficient attention to building coherent understandings of these principles and thus not prepare students for the world of work, despite its avowed aims of doing so. However, it is not only a mastery of knowledge that is needed in the contemporary workplace, but also an understanding of how it is produced.

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The 'knowledge economy', or the idea that it is cutting-edge knowledge rather than agriculture or industrialisation that drives economic growth has replaced the economic models based on mass production that dominated the last century. As a result, knowledge is produced at a rapid rate and graduates need to be able to evaluate its quality as it emerges. The implications for the universities are that students need to learn about the research processes leading to its development as well as the knowledge itself. As the COVID-19 pandemic has shown, it is not only for economic reasons that graduates need to understand processes leading to the production of new knowledge. As the pandemic struck, scientists across the world joined forces to understand the virus and its impact on the human body. The need to do so led to the daily release of preprints or articles which had not been subject to rigorous peer review. Journalists picked up on these publications and anyone engaging with the media was subject to an onslaught of seemingly contradictory information. Making sense of research on the virus required, amongst other things, an understanding of the way scientific knowledge is produced incrementally, of the way contestation and debate contribute to rigour, and of the need to evaluate the evidence provided for claims made.

Although examples of the introduction of research into the undergraduate curriculum exist (see, for example, Knight *et al*. (2016), in relation to the medical curriculum, Grossman and Naidoo, 2009; Walton and Rusznyak, 2016; and Ludlow, 2007), in South Africa at least, this practice is by no means widespread, even at so-called 'research-intensive' universities. As Boughey (2012) points out, when asked to discuss the 'research teaching nexus', the five institutions identified by the Council on Higher Education, the body conducting the audits, as 'research intensive' were unable to provide adequate explanations of the ways in which their status impacted on their teaching. Ideally a university serious about developing students as knowledge makers would adopt an institution-wide approach to embedding research in the undergraduate curriculum driven by policy and strategy. Doing this would, however, involve thinking about undergraduate teaching in very different ways to those that arguably dominate currently.

A major challenge to such an endeavour is that academics themselves often fall along a spectrum with two problematic ends. At the one end are academics who are novices to the field themselves. They are busy with their own postgraduate studies and may have limited experience of knowledge creation (and with the academic texts whereby such knowledge is disseminated). They are not yet fully active knowledge creators and thus are ill placed to design research tasks that explicate the nature of knowledge in the field and induct students into it. In South Africa, this phenomenon is often observed at universities where, historically, staff were recruited based on their expertise in a profession or vocational area and where these same staff members are now pushed into pursuing traditional academic postgraduate qualifications. On the other end of the spectrum are academics who have become so inculcated in the field that all the norms and practices within it have become normalised for them. They battle to 'see' the peculiarities of the knowledge practices because they may have been socialised into them (Weidman and Stein, 2003). This is particularly the case where they themselves took on such knowledge practices and knower identities over time without much by way of explicit scaffolding. This makes it a challenge for them to induct students into knowledge making in a way that includes the scaffolding that will enable the development of undergraduate students' understanding of how knowledge is made.

Introducing Research into the Undergraduate Curriculum

The work of sociologist Basil Bernstein (2000) is useful in helping us to understand what is involved in introducing research into the undergraduate curriculum. Bernstein's interest is in identifying the ways in which knowledge is structured and organised as it moves from the research space to formal education. To do this, he identifies three knowledge fields: the field of production, the field of recontextualization and the field of reproduction. The field of production is the research space and is typically occupied by universities and specialised research institutes. Knowledge produced by researchers in the field of production shifts into the field of

recontextualization where it is selected for inclusion in and distribution by a curriculum. The final shift occurs when knowledge is moved to the field of reproduction (typically characterised as classrooms and lecture halls) although, increasingly, online learning platforms are also spaces for the reproduction of knowledge.

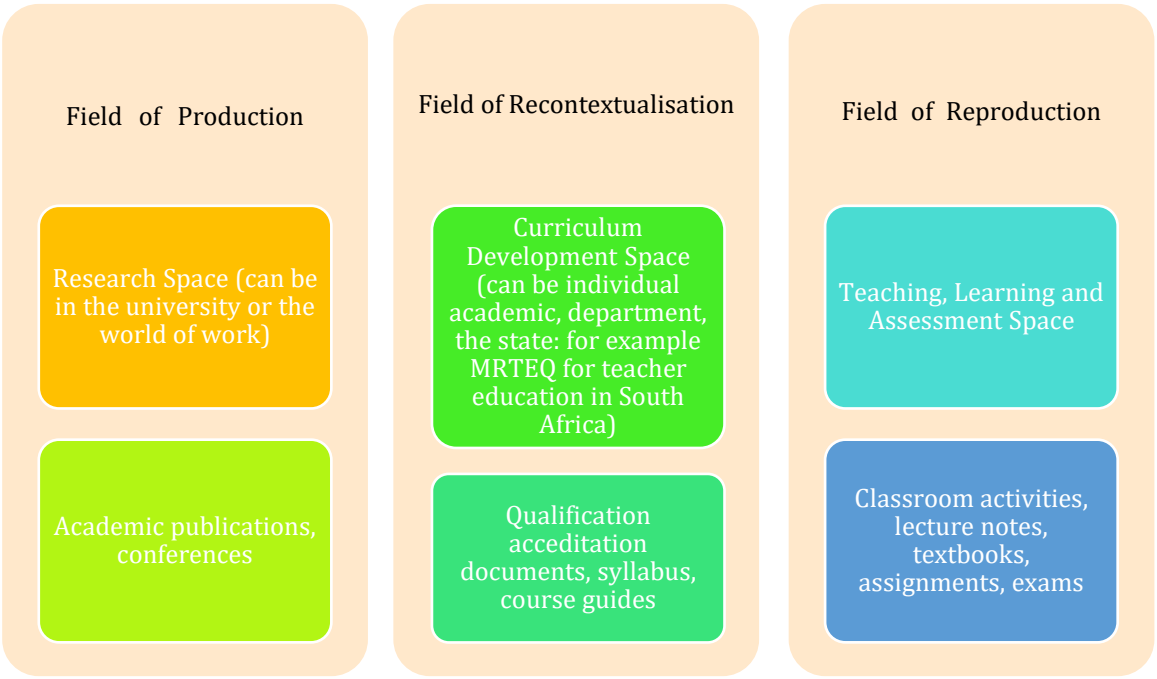

Figure 1: Bernstein's Pedagogic Device (based on Bernstein, 2000)

Bernstein thus allows us to understand that the field of most undergraduate level education, the field of reproduction, is removed from the field in which knowledge is made, the field of production. There are significant changes in knowledge as it moves from one field to another and there are often significant contestations about what aspects of the knowledge from the field of production should be recontextualised and then reproduced and how this should occur. An example of such contestations in the South African context is found in debates about the history curriculum in both secondary and higher education (see, for example, Bertram, 2012; Shay, 2011). One way in which knowledge differs in the field of reproduction to the field of production relates to the way students themselves are understood. Most undergraduate curricula construct students as "knowledge tellers" rather than as "knowledge makers". Pedagogy focuses on explaining disciplinary content and assessment is often aimed at checking that it has been understood correctly. Mastery of the concepts and theories of a field is, of course, crucial because, as Slonimsky and Shalom (2006: 42) argue, "if one is unaware of what has been established in the field, one cannot extend beyond it and claim to be contributing to the development of knowledge" in it. It is, however, important to think more broadly about students' roles in relation to knowledge and what needs to be done to support their development as individuals who can work with knowledge in the future.

Slominsky and Shalom (2006: 42) draw on the concept of "distantiation", signifying the ability to position an object of enquiry in a wider body of knowledge, before arguing that "it is exposure to disciplinary texts . . . which ultimately paves the way for researching the boundaries of established disciplines". This opens the way to considering one important way in which knowledge differs in the field of reproduction to the field of production. In the field of production, researchers understand the incremental and tentative nature of knowledge production and are alert to the status of statements they make about what they consider to be 'true'. This understanding is signalled in academic texts using what linguists' term 'hedges' or 'metadiscourse' in the form of phrases such as 'may', 'could', 'in certain cases' and 'suggests that'. When inserted into a text,

metadiscourse functions like a crack in a wall that can be opened to see what is beneath and expert readers use hedges as indicators that evidence for a claim needs to be interrogated. Studies (see, for example, Latour and Woolgar, 1979; Fahnestock, 1998) have shown that texts written for non-experts such as textbooks lack hedges and instead present knowledge as settled and beyond critique. If students are only presented with texts that do not contain metadiscourse and are not alerted to its function, they may not become alert to ways in which authors signal the tentative nature of their claims or, even, of the fact that knowledge itself is open to contestation. Drawing on Fahnestock's (1998) analysis of a piece of academic text on the feeding patterns of bees when compared to an extract from a textbook on the same subject, Geisler (2013: 13) points out that metadiscourse in the academic text allows the authors to acknowledge that their attempts to reveal a pattern by nature entails acceptance that it is based on a single observation. The nature of the claim to knowledge is thus clarified and laid open to critique. This not apparent in the extract from the textbook where the uncertain nature of the knowledge claim is not made overt. Rather, knowledge is presented as fact.

In some programmes opportunities to engage with authentic academic texts are limited, as students are mainly exposed to lecture notes, course guides and textbooks. As a result, they may never have read any original research from the field as they graduate and thus may not understand what 'counts' as an argument, how claims may or may not be made, and what is seen to be legitimate evidence for such claims. Efforts to introduce research into the undergraduate curriculum thus need to be seen as involving change beyond, say, introducing a course on research methods or getting students to do a small-scale research project. A lot of writing in the undergraduate curriculum also differs from writing in the research space. In the undergraduate curriculum the focus may be on getting students to 'show and tell' by writing descriptions of what they have learned. In the field of production, writing is organised around a series of knowledge claims or statements that authors believe to be 'true', which are then linked together into an overall argument [author]. Importantly, each knowledge claim is supported by evidence which, in a literature review, comes from the literature. This has implications for the way we understand the teaching of referencing and raising awareness of the dangers of plagiarism.

At undergraduate, and even early postgraduate levels, the focus is often on teaching students the technicalities of citing the work of others and issuing warnings about the plagiarism that will result if this is not done correctly. From a knowledge-making perspective in the field of production, citing the work of others is not about avoiding plagiarism (McKenna 2022). It is about joining a conversation and, also, about using the work of others to support claims that writers make as they make sense of a knowledge field and identify gaps for more knowledge making. In the sciences, the claims and evidence often come thick and fast, with almost every sentence ending with a series of names and dates in brackets. In the social sciences and humanities, the making of claims and provision of evidence often involve more discussion. Getting students to understand writing in the field of production thus requires drawing their attention to the notion of knowledge claims and evidence and showing how they work in building an argument in an academic text. Often this work is left to those teaching so-called 'academic literacy' courses. However, our argument is that this work is too important not to be addressed in the mainstream curriculum by those who know how arguments are made in a particular knowledge field.

Ashwin (2021) identifies what he terms "the myth of generic skills". Along with others such as Wheelahan (2010), he argues that the allure of generic descriptions of complex academic activities is that they separate the practices from field-specific norms and processes, and this allows simplistic 'training' to be put in place. This training is often cost effective, in that a single course, often taught by a relatively junior so-called 'language specialist', serves many knowledge areas. It also absolves academics in the mainstream disciplines from doing the serious work of inducting students into knowledge making. However, if an institution or an individual academic teacher is serious about introducing research into the undergraduate curriculum, this cannot be avoided if students are to develop authentic field-specific practices as knowledge makers.

The introduction of research into the undergraduate curriculum can be conceptualised as involving a focus on knowledge. However, our brief discussion of shifts that occur as knowledge moves from the field of production to the field of reproduction points to changes that are required in students themselves changes, involving a different relationship with academic texts. The discussion has begun to explore what happens when knowledge is moved from the field of production to the field of reproduction. In many respects, introducing research into the undergraduate curriculum or, indeed, introducing research in the early postgraduate years, involves 'moving students backwards' from the field of reproduction into which they have been socialised, to the field of production where new understandings and dispositions are required. However, before exploring this idea any further, a word about the nature of knowledge fields themselves is appropriate.

Knowledge fields are not discrete. They overlap extensively and change over time. But creating knowledge in Mathematics is a fundamentally different endeavour to creating knowledge in the Classics. The language is different, the methods are different, and what is valued differs too. Furthermore, while these two examples, Mathematics and the Classics, are very unlike each other, both are disciplines with well-established boundaries and ways of doing things. In the University of Technology sector most fields are what Bernstein (2000) calls "regions", which are areas without such clear boundaries; instead, they draw from multiple disciplines and face directly towards the world of work as well as inwards to the world of theory. A better set of examples, instead of Mathematics and the Classics, when looking at the University of Technology sector, might be Marketing and Somatology. Each of these differs significantly from the other, but each also has porous boundaries in that the knowledge in Marketing and Somatology draws on a great range of other areas of study and each has a clear focus on the workplace.

Undertaking research in newer regions such as Marketing or Somatology is in many ways more complex than doing so in disciplines that have been established over hundreds of years. There is a less strong disciplinary foundation from which to undertake empirical work because the field has "not yet shaken down into a stable, generally accepted, incremental body of knowledge" (Muller 2009: 214). In newer regions, there are multiple debates about not only how one should go about researching a phenomenon, but even what constitutes a suitable phenomenon to research, because such a region is "more diffuse, fluid and less organised, and consequently sends out more ambiguous, frequently contradictory signals about professional requirements" (Muller 2009: 214). On the plus side, undertaking research in regions can be enabled by the practical nature of much of the knowledge, whereby what is valued is a direct and immediate application for the workplace. Implementing research in the undergraduate curriculum can thus be enormously empowering for students in regions, as it allows them to make sense of how the knowledge of the curriculum relates to practical knowledge for the workplace.

Defining and exploring a knowledge field thus requires of academic staff to reflect on what is 'legitimated' or sanctioned within a particular area. Legitimation Code Theory (LCT) has been used extensively in South Africa as a powerful means of supporting academics to 'see' the nature of their fields. These tools have been used for such staff development in such fields as law and political studies (Clarence, 2013), teacher education (Rusznyak, 2022, curriculum and programme development (Gachago *et al*., 2021), developing assessments for design courses (Giloi and Quinn, 2019), the nature of STEM fields (Hatisaru, 2021), and many others. Given the observations made above about challenges to academic staff who may either be novice researchers in a knowledge field themselves or adepts who are so familiar with knowledge making in a field that they cannot actually 'see' what is legitimated, LCT offers enormous potential in introducing research into the undergraduate curriculum.

Legitimation Code Theory

Maton's (2014) work extends Bernstein's pedagogic device outlined above to include paying attention to the status of knowers in a field of practice. Maton's concern is in identifying the basis

for legitimate participation in a field and he offers several theoretical tools to allow us to do this. Maton's argument is that, in some fields, it is the kind of knower within the field that is particularly important; in other fields, legitimation is mainly based on knowledge, and in yet other fields, specific combinations of knower disposition and knowledge is needed for legitimacy. From this perspective, inducting students into a research field not only calls for an understanding of which kinds of knowledge are legitimated in a particular area, but also what kinds of knowers are privileged. We began to outline this point earlier when describing what was required of students in relation to reading and writing in the field of production compared to the field of reproduction. We now take up the idea of needing to understand which kinds of 'knowers' are legitimated in a knowledge field as well as which forms of knowledge are sanctioned by looking at one tool in the LCT 'toolbox' more closely, the tool of 'specialisation'.

Specialisation

Specialisation is based on the simple idea that every knowledge practice is oriented towards something and is performed by someone. Conducting research consists of a set of knowledge practices, things people do to produce knowledge. In LCT, practices are always about some form of knowledge, and these relations between the practices and knowledge are termed 'epistemic relations. However, practices are also always performed by someone. The relations between the practices and the person who performs them are termed 'social relations. There is knowledge in every field, but its complexity and importance can vary from field to field. Some fields emphasise possession of specialized knowledge, while others downplay knowledge in favour of emphasizing the attributes of knowers as a measure of achievement. In some fields, for example, it is appropriate to speak of the need for 'talent', understood to be inborn, whilst, in others, the ability to practise is understood as something that can be taught. Maton (2014) allocates the strength of epistemic relations and then social relations on continua ranging from strong (+) to weak (-). He then superimposes these two sets of relations onto a Cartesian plane as shown in the graphic below.

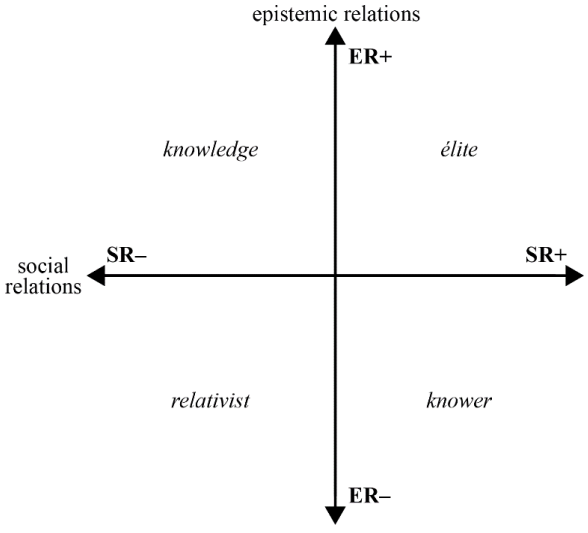

Figure 2: Maton's Specialisation Codes (Maton, 2014)

In the graphic, relations to knowledge (epistemic relations) intersect with relations between knowledge and its creators (social relations) to show four 'codes': a knowledge code, an elite code, a relativist code, and a knower code. In fields with a knowledge code, the possession of specialized knowledge, principles or procedures is emphasized as the basis of achievement and the attributes of knowers are less significant. They would thus be coded as ER+/SR-. and classified as having a knowledge code. The study of music is often understood as needing an 'ear' or 'talent' of some sort as well as technical knowledge of music itself. It might thus be coded SR+/ER+ and classified

as having an elite code. In other fields, being a particular kind of knower (by, for example, using feminist theory) is understood to require the development of specific perspectives and insights and knowledge itself is downplayed (SR+/ER-). Such fields would be seen as having a knower code. Finally, in a field with a relativist code, on the other hand, neither specialised knowledge nor attributes are needed.

Ellery's (2017; 2018) work using LCT to explore a 'foundation' course in science shows how the use of LCT coding can assist in designing and teaching an initiative intended to introduce them to research in the sciences. As noted above, fields in the natural sciences are often understood as having a knowledge code indicating that, potentially, they are open to anyone who has acquired the specialized knowledge necessary to practice in them. However, Ellery's research identified the need for knowers in the field of practice to be display certain attributes associated with being methodical, observant, accurate, and so on. The foundation level course she explored required of students to conduct a very simple research project, but the insights provided by LCT showed how, to do this successfully, students needed to be guided in developing the kinds of attributes that are legitimated in scientific research. As a result, the research task not only involved supporting students in the design and execution of a simple experiment (for example, a study of the way different conditions impacted on plant growth) but also focused on their ability to maintain records, measure accurately and so on, that is, to 'be' specific kinds of people.

Typically, Fine Art would be classified as having a knower code; that is, a field in which being a legitimate knower requires attributes. Dallow (2003) constructs knowers in Fine Art as reflexive practitioners who draw on understandings of social, political, and historical issues to explore an artwork in context. A research task in a field such as Fine Art might therefore involve the design of an artwork or artefact that requires of students to draw on their knowledge of a particular political, social, or cultural issue but to move between this knowledge and their making of the work reflecting on what has emerged by referring to the issue and then moving back to making. The development of students as reflective practitioners needs careful support. From this perspective, developing a task to introduce students in a Fine Arts-based course to research will involve ensuring that they have access to the knowledge of social, political, and historical issues they need, but also one that calls on them to think about how, for example, a research output in the form of a creative work explores an issue.

In some knowledge areas, a problem or issue is viewed from a particular perspective, for example, the perspective of being a woman, a black South African, or Zimbabwean in South Africa. The perspective thus provides a particular view of a problem or issue that will differ from those, resulting from a different perspective. Research in knowledge areas where this is legitimated (and Maton (2014) cites cultural studies as an example of a field where this is the case) requires of researchers to be particularly aware of their own 'positionality' and how this will colour what they see as they examine a problem or issue.

Although fields may be coded as having knowledge or knower codes, it is important to remember that all fields have both knowledge and knowers, and we need to pay attention to how both dimensions work in the specific field as we think about introducing research into the undergraduate curriculum. It is also important to remember that a particular course or set of activities (including the introduction of a research project) can also be coded using specialisation. It is possible to imagine a scenario where an academic wanting to introduce research into the undergraduate curriculum does not require research projects to draw on a specialised body of knowledge (ER-) and which also focuses on allowing students to 'find their own meanings' in that they are not required to be kinds of knowers (SR-). The initiative could therefore be coded as ER-/SR- and as having a relativist code. Chen *et al*. (2011) analyse an online course offered to Chinese students studying in Australia as drawing on a relativist code which 'clashed' with learners' own experiences and expectations of strong epistemic relations. This example leads us to see the

importance of asking questions about students' expectations and how we might work either to accommodate them or challenge them through careful scaffolding.

Thinking about which kinds of knowers are legitimated in a particular field is therefore as important as thinking about which kinds of knowledge are valued. Introducing research into the undergraduate curriculum therefore involves not only teaching about the techniques or methods students can use in a project but, importantly, also considering who they need to be as they engage with it. In many cases, as Ellery's (2017) research shows, this will involve supporting students to develop the attributes they need to demonstrate to be considered legitimate knowers in a field. In Ellery's work, a great deal of attention had to be paid to stressing the need for close observation and accurate record keeping, because the students in the foundation course had never been introduced to the importance of doing this in any of their previous learning experiences.

In another project where, for example, students are called upon to design a leisure space as a piece of research it might be necessary to get them to consider how their designs reflect them as individuals, their age, and social backgrounds and how their design accommodates the needs and preferences of individuals who are very different to them. Conducting the project might involve designing a simple questionnaire to give to prospective users or interviewing users. Guiding students to think about the identity of the researcher or the knower would be important as the questions are developed.

Conclusion

In this article we have provided some conceptual tools which we believe help to clarify what is involved in introducing research into the undergraduate curriculum. The use of Bernstein's (2000) pedagogic device has allowed us to argue that introducing undergraduate students (or early postgraduate students, for that matter) to research will require of them to move 'backwards' from the field of reproduction into which they have been socialised through the educational experiences available to them to the field of production. This process involves more than simply introducing a course on research methods or research design or getting students to complete a research project. It also requires the reconceptualization of a lot of the activities to which students are exposed in any programme, especially activities involving reading and writing. Our use of the LCT tool of specialisation (Maton, 2014) has allowed us to argue that attention not only needs to be paid to the forms of knowledge legitimated or 'allowed' in a particular field, but also the kinds of knowers who are seen as authentic researchers. Again, this is something that we believe has profound implications for classroom practice and curriculum design. Our hope is that this article will open the way for these considerations to be included.

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