THRESHOLD CONCEPTS: LINKING COMPLEX MEANING IN FINANCIAL INSTRUMENTS WITH STUDENTS' PRIOR KNOWLEDGE IN ACCOUNTING AND THEIR LIVED EXPERIENCES

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ABSTRACT

Educators often face challenges in teaching accounting concepts and terminology in a way that helps students truly understand their meaning. In the specialised field of financial instruments, identifying and foregrounding the complex meanings of threshold concepts is often challenging. This study identifies five threshold concepts in accounting for financial instruments and describes how these concepts are bounded in the financial accounting discipline. Student participants describe how they navigate through the liminal space of troublesome knowledge to transformative knowledge and whether these concepts, once grasped, enable the irreversibility of knowledge and understanding. The findings indicate that students experienced the concepts conceptually difficult and troublesome, specifically relating to language. The findings suggest that connecting threshold concepts with prior knowledge and contextualising their meaning with students' lived experiences led to irreversible knowledge.

Keywords: Accounting education, threshold concepts, troublesome knowledge, transformation, financial instruments

INTRODUCTION

Identifying threshold concepts in a particular discipline or field benefits educators, students, and the overall learning process. In accounting, the abstract nature of financial instruments results in educators often struggling to teach and students grasping and learning the accounting and reporting requirements. Several concepts within the specialised field of financial instruments have context-specific meaning, for example, shares, debentures, loans and interest (Lubbe, Modack and Herbert, 2019, 386). In financial accounting, students must recognise, classify, measure and record financial instrument transactions. By identifying threshold concepts and focusing on their transformative nature, educators can prioritise essential knowledge and skills that lead to deeper understanding and improved student learning outcomes (Schönfeldt, Hancock and Birt, 2020, 4). Using the Threshold Concepts Framework (TCF) (Meyer and Land 2003, 2005), this study identifies threshold concepts bounded within the specialised field of accounting for financial instruments. Furthermore, student participants' responses inform whether these concepts, once grasped, enable the irreversibility of students' knowledge and understanding.

Threshold concepts are defined as the "conceptual gateways" (Meyer and Land 2005, 373) that enable a transformed way of thinking in a discipline where mastery demonstrates an expert state of knowledge (Davis and Green, 2020; Walker, 2013). A threshold concept refers to a troublesome and often challenging concept or idea within a particular discipline or field of study that, once understood, opens new ways of thinking and understanding within that field. It represents a crucial point in learning where students' perspectives are significantly altered, enabling them to perceive the subject matter from a new and more sophisticated viewpoint (Barradell and Kennedy-Jones, 2015; Zepke, 2013). Contextualising concepts and terminology in disciplinary knowledge that are difficult to understand and connecting their meaning with prior knowledge brings students into the liminal space (Cousin, 2006; Hill, 2020; Meyer and Land, 2006). Even though this stage encapsulates a period of identity shifts, which can entail "troublesome, unsafe journeys" (Cousin 2006, 5), an epistemological shift is experienced (Calduch and Rattray, 2022) as students transfer towards mastery of a threshold concept.

Research in accounting education centres on the challenges emerging from teaching and learning complex concepts and terminology requiring integrated critical thinking skills (Dickins and Reid, 2022). Little research has been done to develop an understanding of the challenges students encounter when learning contextually bounded concepts. Identifying threshold concepts illuminates the critical components of disciplinary knowledge, and grasping the meaning of these concepts has the potential to fundamentally change students' understanding

of a subject, thereby supporting students to navigate the dense and complex accounting curriculum at university (Lubbe, 2017; Van Mourik and Wilkin, 2019).

The review of the literature and framework provides an overview of the theory of threshold concepts and a summary of studies that identified, described and analysed threshold concepts in various disciplines. Focussing on the five characteristics of threshold concepts (Meyer and Land, 2005; Barradell and Kennedy-Jones, 2015), these research questions are identified:

RQ1: How are the threshold concepts identified in this study *bounded* in the accounting discipline?

RQ2: What is "troublesome" and "transformative" about these concepts, and how do these concepts *integrate* with prior knowledge in accounting?

RQ3: Does the identification and contextualisation of the threshold concepts lead to "irreversible" knowledge?

The methodology applied for data collection to ascertain the threshold concepts in the specialised field of financial instruments is described below. Data sources include focus group discussions with educators and semi-structured interviews with students.

Contribution of this study

While other studies have identified and explored some of the characteristics of threshold concepts in accounting (Magdziarz, 2016; Weil and Mcguigan, 2010; Van Mourik and Wilkin, 2019; Schönfeldt et al., 2020), this study extends existing accounting education literature by identifying threshold concepts in a specialised field and making conceptual links with prior knowledge and lived experiences of students. This study contributes to the literature by identifying threshold concepts in the specialised field of financial instruments and, through insights obtained from educators and students, describes how threshold concepts, once grasped, result in the irreversibility of knowledge and understanding of the meaning of these concepts. The emphasis on threshold concepts in this study demonstrates to accounting educators that, by identifying threshold concepts and enabling troublesome concepts to become transformative when framed within students' prior knowledge, these concepts become irreversible knowledge.

REVIEW OF THE LITERATURE AND FRAMEWORK

The TCF (Meyer and Land, 2003, 2005) serves as a conceptual toolkit to analyse and dissect components of knowledge that require mastery within a curriculum (Quinlan, Male, Baillie, Stamboulis, Fill and Jaffer, 2013; Rodger, Turpin and O'Brien, 2015). Threshold concepts are identified as "boundary markers" (Van Mourik and Wilkin 2019, 314) and are described as the key conceptual building blocks that signal a transformative way of thinking within a discipline. Proficiency in the understanding and application of these threshold concepts is pivotal for identifying the relationships between concepts and achieving discipline-based conceptual change (Van Mourik and Wilkin, 2019).

The application of the TCF in disciplines has concentrated on analytical studies that determine what components of knowledge are threshold concepts within arenas of curriculum design. Since the inception of the TCF, its usage in a wide range of disciplines, such as information systems, medicine, economics, and engineering, has been observed. In accounting, studies in threshold concepts include accrual accounting (Magdziarz, 2016), bank reconciliations (Weil and Mcguigan, 2010), management accounting (Van Mourik and Wilkin, 2019) and consolidations (Schönfeldt et al., 2020).

Characteristics of threshold concepts

Threshold concepts exhibit the following characteristics: they are likely to be transformative, bounded, probably irreversible, integrative and possibly troublesome, resulting in troublesome knowledge (Meyer and Land, 2005). The transformative characteristic is considered the cornerstone of the TCF (Barradell and Kennedy-Jones, 2015; Calduch and Rattray, 2022), described as a material and permanent conceptual shift because mastery of the threshold concepts enhances students' understanding of the subject knowledge. This powerful conceptual shift, either protracted over time or occurring suddenly, signals students' ability to understand the application and relativeness of the concepts in a discipline. This mastery of knowledge and understanding enables students to find alternative ways of solving problems, which enhances their ability to apply knowledge across contexts. Notably, the transformative characteristic distinguishes threshold concepts from core concepts in a discipline (Meyer and Land, 2005).

"Transformative" refers to "a new and previously inaccessible way of thinking about something" (Meyer and Land 2005, 375). It is that material conceptual shift in students' aptitude to comprehend knowledge within a discipline that, once mastered, produces a feeling of inclusion and belonging within a discipline, resulting in an enduring conceptual change in

knowing (Walker, 2013). Further to this, what students know and how they learn is developed as students' framework for understanding is permanently altered (Rodger et al., 2015). This also speaks to the irreversible characteristic of a threshold concept: once students acquire a threshold concept, it is difficult to unlearn (Basgier and Simpson, 2020).

Contextualising threshold concepts within a discipline makes it "bounded", as these concepts may only be entrenched in specific disciplines. For example, depreciation carries a precise meaning to an accounting student (Myers, 2016), highlighting the epistemic connection (Rodger et al., 2015). The "bounded" aspects of a threshold concept and its "integration" into other related situations within the discipline make it irreversible (Barradell and Kennedy-Jones, 2015). A threshold concept is "integrative" as it clarifies how concepts relate to each other to form a coherent understanding and demonstrates how previous concepts that may seem unrelated are now connected (Cousin 2006; Zepke 2013). Applying knowledge within a discipline supports its boundedness, while integrating knowledge from other related situations supports its irreversibility.

The "troublesome" characteristic of threshold concepts includes aspects of disciplinary knowledge that need to be more conceptually understood (Eckerdal, McCartney, Moström, Ratcliffe, Sanders, and Zander, 2006; Hill 2020). Perkins (1999), cited in Meyer and Land (2005), proposes that forms of troublesome knowledge include ritual, inert, conceptually difficult, alien, tacit and troublesome language. As Cousin (2006, 4) suggests, mastery of a threshold concept could be inhibited by the inert, troublesome knowledge experienced when students have a limited "common-sense or intuitive understanding of it". Conceptually complex knowledge refers to the application of integrated knowledge, while a lack of understanding of why such an application is required leads to a mistaken impression. Alien knowledge is the extraneous use of knowledge that may conflict with an individual's belief system. At the same time, troublesome language refers to discipline-specific terminology that individuals may not have encountered in their lived experiences (Cousin 2006).

Meyer and Land (2005) indicate that a threshold concept, once mastered, can materially reconfigure a student's perception of a discipline or the nature of their reality. Once understood, the knowledge is described as "irreversible" (Cousin 2006), as it is typically difficult to revert to the previous way of thinking. However, a concept that requires understanding may not result in a significant alternative view; for example, if a student experiences a concept as challenging, it could be problematic to distinguish a core concept from a threshold concept (Barradell and Kennedy-Jones, 2015). This distinction then hinges on the characteristic of transformative being the dividing factor between a core concept and a threshold concept.

The TCF has faced criticism for its disparity in the application (Calduch and Rattray, 2022), lack of transparency (Quinlan et al., 2013) and variation in the research methods used (Stopford, 2021). The absence of clarity on whether all five characteristics need to be present for a concept to be considered a threshold concept has been questioned (Hill, 2020; O'Donnell, 2010). The TCF is permeable in its application rather than a prescriptive set of criteria that must be fulfilled. Some argue that all five characteristics need not be met for a concept to be classified as a threshold concept (Hill, 2020). In contrast, Rodger et al. (2015) propose that a mandatory existence of all five distinct characteristics needs to be present for a concept to be considered a threshold concept. Notably, the literature suggests (Quinlan et al., 2013; Walker, 2013) that the transformative characteristic remains paramount to the TCF.

In the journey towards mastery of threshold concepts, students may reside in a state of *liminality*, which signals a period of uncertainty and fragmented understanding in the learning process until the concept is grasped (Goebel and Maistry, 2020). During this transitional phase, students may experience uncertainty, ambiguity, and cognitive dissonance as they move away from their previous ways of thinking and engage with new ideas. This state of learning encapsulates a period of instability and "troublesomeness" (Land 2016, 11) where the student manoeuvres towards mastery of a threshold concept but also navigates between prior and newfound ways of understanding a concept (Cousin, 2006; Meyer and Land, 2005).

Thus, with reference to threshold concepts identified in the specialised field of financial instruments, this study applies the five characteristics of threshold concepts (Meyer and Land, 2005; Barradell and Kennedy-Jones, 2015) to first identify and describe how threshold concepts in the specialised field of financial instruments are bounded in the accounting discipline; second, to establish whether students experience these threshold concepts as troublesome and transformative; and third, to determine whether mastery of these concepts leads to the irreversibility of knowledge and understanding.

Data sources to inform the research questions in this study include focus group discussions with educators and semi-structured interviews with students. The methodology applied for data collection to identify the threshold concepts in accounting, and more specifically, the specialised knowledge embedded in the accounting of financial instruments, is described next.

RESEARCH DESIGN AND METHODOLOGY

Even though identifying threshold concepts matters, they are not easily identifiable. Barradell and Kennedy-Jones (2015) call for an identification process that has rigour, requiring input

from educators, students and participants beyond the educational domain. To meet the aims of this study, concept descriptions were obtained from the International Financial Reporting Standard (IFRS) dealing with Financial Instruments (IFRS 9). At the same time, qualitative data were collected from educators and students. The data collection consisted of (1) interviews with educators to independently identify threshold concepts in the specialised field of financial instruments and (2) semi-structured interviews with student participants.

The participants were purposively selected to represent accounting educators with relevant technical knowledge and practical experience in teaching accountancy in South Africa. Data collected from accounting educator participants informed the identification of the threshold concepts in the financial instruments module, while the data collected from student participants supported the analysis of students' experiences of the threshold concepts identified in financial instruments.

The threshold concepts in financial instruments were identified through discussions with accounting educator participants. Participants were purposively selected, with respondents identified as Participants A to H. The participants' responses to identifying threshold concepts in financial instruments were transposed onto an MS Excel matrix. This enabled the identification of key terms, phrases and concepts (Saldaña, Huberman and Miles, 2013) using NVivo Coding to analyse these non-numeric open-ended responses using word frequency, text search and matrix coding features. Grouping similar responses into themes supported identifying the threshold concepts, which were subsequently reviewed and confirmed by a subject expert. The expert did not participate in the data collection in step one.

The following five threshold concepts emerged in the financial instruments module after NVivo coding was used to identify themes from accounting educator participants:

- The meaning of a "financial instrument" as a concept (TC1).
- The meaning of an entity's "business model" in the context of decisions relating to financial instruments (TC2).
- The "time value of money" (TVM) principles (TC3).
- The initial and subsequent recognition and measurement of financial instruments (TC4).
- Identifying the type of financial instrument (TC5).

The "boundedness" of these threshold concepts is described concerning their meaning and definitions articulated in IFRS (RQ1), while insights from educators describe what is "troublesome" and "transformative" about these concepts and how they "integrate" with prior knowledge in accounting (RQ2).

Semi-structured interviews were conducted with students to determine whether their contextualisation of the threshold concepts may lead to irreversible knowledge of financial instruments (RQ3). Student participants were purposely selected based on their willingness to participate in this study and whether English was their second language. The language was considered necessary for making sense of threshold concepts, as second-language students often face language barriers when learning in a language that is not their mother tongue (Wynder 2018). Language may impact students' ability to comprehend concepts, express themselves, and fully participate in classroom activities. Troublesome knowledge originates from troublesome language (Davis and Green, 2023) when studying in a language that is not a home language. Seven students participated in the voluntary interviews and were identified as Student Participants 1 to 7. During the interviews, student participants were explicitly asked to share instances where disciplinary knowledge was experienced as troublesome and whether a material conceptual shift, thus demonstrating irreversible knowledge, had been experienced in their understanding of financial instruments. Their responses were categorised and linked to RQ2 and RQ3.

DISCUSSION AND FINDINGS

The five threshold concepts identified in the financial instruments module inform the discussion of the first research question. Extracts from student participants' interviews support the findings in the second research question, while the irreversibility of knowledge associated with the threshold concepts (research question three) is considered based on the interviews with student participants.

RQ1: How are the threshold concepts identified in this study *bounded* in the accounting discipline?

Applying knowledge within a discipline and demarcating a specific area of focus supports its boundedness (Davis and Green, 2020; Goebel and Maistry, 2020). The boundedness of a concept refers to the idea that certain transformative and challenging concepts within a discipline have well-defined boundaries that distinguish them from other ideas or knowledge structures. These boundaries represent the specific characteristics, core principles, and fundamental insights that define the threshold concept, setting it apart from other concepts in the field. International and professional bodies influence disciplinary knowledge in accounting through the development and adoption of International Financial Reporting Standards (IFRS)

and the accreditation process (Alzeban, 2016; Ellington and Williams, 2017). These IFRS form a crucial component of the accounting discipline as they direct how transactions are recorded, presented and disclosed in an entity's financial statements. Describing IFRS as "principles-based accounting standards", Hodgdon, Hughes, and Street (2011, p.416) suggest that considerable judgement is often required in applying IFRS. These include pervasive issues such as going-concern assumption, materiality and related disclosures, and problems applying most IFRSs, including presentation and disclosure, classification, recognition/de-recognition and measurement. This study focuses on threshold concepts identified in the financial instruments module; thus, the principles and terminology included the accounting standards relating to financial instruments, namely IFRS 9, "Financial Instruments" and IAS 32, "Financial Instruments: Presentation".

A financial instrument is defined (TC1) as a "contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity" (IAS 32, 2020, p. A1546). This definition illustrates the boundedness of this threshold concept, where the meaning of a "financial instrument" is limited to the definition in IAS 32, and the usage of the term demonstrates a particular way of thinking (Rodger et al., 2015). Identification of this threshold concept was confirmed by 12 responses, as evidenced in the comments below:

> "The actual definition of financial instruments and how they are split between equity and liabilities." (Participant G)

> "Can you actually identify a financial instrument is a threshold concept…we tend to think of it [financial instruments] as only bonds or shares not realising that trade receivables and payables are also examples." (Participant C)

> "The definition of a financial instrument is a threshold concept." (Participant E)

The meaning of a "financial instrument" as a concept (TC1) is an example of key disciplinary knowledge that is contingent on students' ability to identify the type of financial instrument encountered and determine the parties and their respective roles in a transaction, for example, identifying the issuer or the holder of the financial instrument. Mastery of this threshold concept is dependent on students' prior knowledge of the definitions of an asset, equity and a liability and applying this in the context of financial instruments. The integrated nature of this threshold concept, coupled with the cumulative knowledge-building required to demonstrate mastery of this threshold concept, is evident in two written responses from focus group participants:

> "… I found the difference between equity instruments and debt instruments to be key in understanding financial instruments…" (Participant A)

> "This was the first time we actually saw the importance of the liability definition…" (Participant B)

Participant A's response illustrates how proficiency in determining the characteristics of equity and debt instruments influences the ability to apply the concept of a financial instrument. The hierarchical knowledge structure of accounting knowledge is evident, as the construction of new knowledge relating to the concept of a financial instrument is dependent on students' capability to master other components of knowledge first, such as an in-depth understanding of the meanings of equity and debt instruments. These responses reveal how threshold concepts amalgamate fundamental concepts within a discipline (Eckerdal et al., 2006), as seen in Participant B's response, and reveal how this threshold concept is entrenched in the IFRS, a source of legitimate text in accounting.

An entity's business model (TC2) is based on its business objective and how a portfolio of financial assets is managed together to achieve this business objective (IFRS 9: B4.1.2, 2020, p. B512, 2019). Three business objectives are identified for the acquisition of a financial asset: (1) the financial asset is held to collect contractual cash flows; (2) collecting contractual cash flows and engaging in the selling of the financial asset; and (3) where the intention is neither to collect contractual cash flows nor to trade the financial asset. The bounded nature of this threshold concept is evident as the term "business model" carries a distinct meaning in the context of financial instruments, as explained above.

These responses illustrate the conceptual significance of the business model emerging from the focus groups:

> "Given the whole business model approach we use, ...it is important that students understand how the business operates, specifically regarding their intention [behind holding] the financial instrument." (Participant C)

> "Understanding the concept of the business model drives the classification and the accounting treatment." (Participant E)

The entity's business model affects the classification of the financial asset (either at fair value or amortised cost), which suggests that if students have not mastered TC2, their understanding is insufficient to master this threshold concept. This demonstrates how students experience a knowledge block when proficiency of another threshold concept has not yet occurred, and that the hierarchical knowledge structure in accounting impacts knowledge-building.

The time value of money principles (TC3) relate to the recognition and measurement of

financial assets and financial liabilities using the amortised cost[1] model. This threshold concept exposes the integration of accounting and finance knowledge (see RQ2 below) as students must demonstrate proficiency in calculating interest using an appropriate discount factor and computing present value and future value amounts. The application of time value of money principles, as it relates to the amortised cost model, illustrates the boundedness of this concept. Applying the time value of money principles depends on mastering financial instruments as a concept (TC1) and understanding an entity's business model (TC2). The comments below highlight the importance of the time value of money (TVM) principles in financial instruments, as identified by participants in the focus groups:

> "I found that without this understanding of the time value of money, the whole section (financial instruments) seems pointless." (Participant D)

> "The ability to use TVM concepts is crucial here [about financial instruments]." (Participant F)

The recognition and measurement of each type of financial instrument (TC4) requires the classification of the instrument, which is based on its distinct characteristics and transactional effects. The recognition and measurement principles of assets and liabilities (TC5) are bound in the accounting discipline, as these refer to when an asset or liability is recognised and at what value.

Focus group participants signalled the importance of understanding the recognition and measurement criteria:

> "Understanding how the accounting treatment [recognition and measurement] impacts the financial instrument." (Participant E)

> "Knowing the difference between equity instruments and debt instruments has a knock-on effect on the accounting treatment." (Participant F)

> "I remember when they were giving examples of them [financial instruments], and now I have to associate it with the recognition of a financial asset and financial liability." (Participant H)

The type of financial instrument (TC5) is identified as a threshold concept regarding its characteristics, for example, whether it is an equity instrument or a debt instrument (thus meeting the liability definition and recognition criteria). The terminology that describes these

[1] Amortised cost is the measurement of the present value of a debt instrument by discounting the future cash flows using an effective interest rate.

characteristics has a distinct meaning that supports identifying the type of financial instrument. Students are required to use these terms to identify the type of financial instrument and to apply the specific recognition and measurement principles based on the classification of that financial instrument. While threshold concepts are discipline-specific (Rodger et al., 2015), this threshold concept depends on extensive general knowledge and understanding of different types of financial instruments, such as debentures.

The challenges experienced in understanding the terminology of financial instruments, and thereby the type of financial instrument (debentures) were evident in this student participant's comment:

> "Terminology is very important because you could be doing a calculation in debentures … it's very important that you know who you're dealing with and from their perspective [issuer or holder] in order to produce answers." (Student Participant 2)

Identifying the type of financial instrument highlights the importance of drawing meaning from the terminology, which in turn affects the recognition and measurement of the financial instrument. For example, a debt instrument (or debenture) is classified as a liability as it has a fixed maturity date when the debt will be settled. This student participant had trouble with the meaning of the term "debenture":

> "I still struggle with what a debenture actually means … I did Finance so I heard it before, but I don't have a full understanding of what it is. I know there is a lot of terminology but the easier ones like the financial assets and all of those things it is easier to understand…but debentures and bonds I don't really understand." (Student Participant 5)

Thus, the "boundedness" of these threshold concepts within the accounting discipline requires students to apply principles associated with classifying, recognising and measuring assets, liabilities and equity. This requires identifying and using appropriate terminology bound in the accounting discipline. How students experience these threshold concepts, as "troublesome" when conceptually challenging to understand and "transformative" when encountering a new and previously inaccessible way of thinking about something, is discussed next.

RQ2: What is "troublesome" and "transformative" about these concepts, and how do these concepts "integrate" with prior knowledge in accounting?

Threshold concepts are often initially difficult for students to grasp (troublesome), requiring them to confront and overcome various conceptual barriers or misconceptions (Eckerdal et al., 2006; Hill, 2020). However, once grasped, they have the potential to fundamentally change

students' understanding of a subject (transformative), leading to a paradigm shift in their thinking. Threshold concepts can connect different ideas and concepts within a discipline (integrative), providing a framework for organising knowledge and facilitating deeper understanding (Cousin, 2006).

Student participants experienced troublesome knowledge because of troublesome language when applying the key terms of "financial asset", "financial liability" and "equity" (TC1) in the context of the issuer and the holder of the financial instrument:

> "Identifying who has financial asset and liability, equity was challenging … it took a while to pick up, actually this a financial instrument … I think having to identify that it's a financial instrument is a challenge." (Student Participant 1)

> "Sometimes they give you a question and I couldn't distinguish whether it was a financial asset or liability." (Student Participant 2)
> "The whole debt and equity instrument thing was confusing for me … asset for you but what's it for me." (Student Participant 3)

> "I am not sure what a financial instrument is exactly and what it does and what you use them for." (Student Participant 5)

These comments by student participants demonstrate the critical role of unpacking the intricate meaning of the terminology rooted in the definition of a financial instrument. In previous accounting courses, student participants engaged with the definitions of assets, liabilities and equity. However, they may have struggled to build new knowledge because of the abstract nature of the threshold concept and the conceptually dense terminology embedded in the definition of a financial instrument. How students engage with previous knowledge may also impact their ability to master this threshold concept (Calduch and Rattray, 2022).

Mastery of TC1 not only relies on the student's ability to appreciate the holistic view of this concept, as it encompasses assets, liabilities and equity, but it also brings together the transactional consequences for the issuer and holder of the instrument. The meaning of a "financial instrument" as a concept (TC1) and identifying the type of financial instrument emerged as *"*transformative" for this student participant:

> "I think moving forward I'll never not know who has the debt instruments because it was really hard for me to see." (Student Participant 3)

This comment from Student Participant 3 demonstrates the importance of acknowledging the instrument's issuer and holder. This was conceptually significant for the student, as the classification of the debt instrument as a financial asset or financial liability could be incorrect if one fails to determine from whose perspective the instrument is viewed. The comment also

illuminates how the student navigated the liminal learning space as she encountered knowledge concerning TC1 as troublesome.

Integrating the time value of money principles (TC3) resulted in participants experiencing conceptual difficulty in disciplinary knowledge when combining different sources of knowledge. The Accounting lecturer also noted that students had difficulty using the time value of money principles when applying the amortised cost model to recognise and measure a financial instrument (TC4). The bounded nature of this threshold concept is less apparent as the finance and accounting disciplines coalesce in acquiring this threshold concept.

For these student participants, disciplinary knowledge was experienced as *troublesome* when calculating the carrying amount of a debt instrument (debenture) (TC3), where the coupon payment dates were different to the financial reporting date:

> "The parts where the coupon date and the reporting date was different …it was getting so complex and I am not really good with Finance…It is just a lot of numbers and maths to it rather than just Accounting…But the actual maths to it is where I get a bit confused." (Student Participant 5)

> "I think what I struggled with in this particular question is the dates that differ because I have to remember to include a bit of it for this year and then remember that you still need to include the other bit in next year." (Student Participant 6)

Disciplinary knowledge experienced as troublesome language could emerge when an expert uses particular terminology in a specific context, while these terms may be unfamiliar to individuals not immersed in the discourse. The language of financial instruments is complex, carrying a distinct meaning in the context it applies. The terms have a specific epistemological meaning, and the use of discipline-specific terminology could signal the inclusion of an individual in a community of practice:

> "it's calling things financial assets and financial liabilities. It is still the same thing but now they have a name to it and what they actually are." (Student Participant 5)

This comment shows a transformation of understanding with the application of terminology (TC5) as the student participant can identify the type of financial instrument and apply the terms in a way a disciplinary expert would. This also signals inclusion in a community of practice (Zepke, 2013) as the context-dependence of the terminology is understood. Using the terminology correctly highlights the cultural capital embedded in accounting, demonstrating the knowledge, competencies and skills one would exhibit when part of a field of practice. The correct usage of the terms "financial assets" and "financial liabilities" shows inclusion within the practice of Accountancy.

Limited exposure to financial instruments in students' primary discourse affected what knowledge they encountered as troublesome:

> "You know I can safely say that it in a way disadvantaged me as I never heard of debentures before." (Student Participant 1)
>
> "Let's say if my mother knew something about debentures or shares, financial instruments would have maybe resonated with me more." (Student Participant 2)
>
> "Everybody is always talking about it at home but I don't really understand what it is. Then with loans and stuff my parents and my brothers had to get loans so I know sort of what it is and I understand loans a lot more than the meaning of a debenture." (Student Participant 5)
>
> "If I was exposed to it from a child I would be like more relatable towards it, I will be like okay I think I know this part, so I know how it works." (Student Participant 6)
>
> "Everything that I learned, I am doing this for the first time. I am seeing these things for the first time. No one in my family speaks about these things the way I do." (Student Participant 3)

These comments demonstrate the importance of acknowledging the role of students' primary discourse, as this may influence how the students construct knowledge as they encounter disciplinary understanding. These findings suggest that making threshold concepts explicit may assist students in mastery thereof. Concepts first encountered as troublesome emerged as transformative when integrated with prior knowledge in the discipline.

RQ3: Does the identification and contextualisation of the threshold concepts lead to "irreversible" knowledge?

In the learning process, students could encounter instances where they move between emergent and previous ways of understanding, which may represent uncertainty and instability as they journey towards proficiency in the threshold concept. Once a student has grasped a threshold concept, it becomes an integral part of their understanding and is challenging to unlearn. The transformed perspective leads to a deeper level of comprehension and is not easily reverted to previous ways of thinking, as the knowledge and understanding developed is irreversible (Meyer and Land 2005, 375).

As mentioned before, mastery of threshold concepts can lead to irreversible conceptual understanding and contextualising the threshold concepts within student participants' lived experiences allowed them to form conceptual connections in a practical way that showed irreversibility. One student participant indicated that her previous experience when obtaining a

student loan to fund her studies resulted in familiarity with some of the knowledge encountered in financial instruments:

> "During my first year I funded my studies with a student loan so I am quite familiar with the whole thing, and my dad made me go there, I was very involved in the process, reading the contracts, looking at the interest rates." (Student Participant 7)

This comment by another student participant shows how the knowledge encountered in financial instruments was applied in personal financial decision-making:

> "My brother took out a loan and I said why didn't you come to me, this loan has a high interest rate, I think it was 20 percent, I said why didn't you guys come to me and I got so angry because now he was stuck." (Student Participant 5)

Integration of threshold concepts in familiar contexts and connections with other disciplines makes the knowledge "irreversible" (Barradell and Kennedy-Jones, 2015). For example, the time value of money principles applied in financial instruments rely on integrating accounting and finance knowledge, demonstrating the connection of key disciplinary content that initially appears distinct (Baillie, Bowden, and Meyer, 2013). This prior knowledge interacts with new knowledge when students expand their existing knowledge base to recognise that "shares" also encompass financial assets or liabilities. Student participants developed an understanding of the recognition and measurement principles of financial instruments (TC5), demonstrating the irreversible knowledge experienced:

> "How financial instruments actually work … I was going from not really seeing the whole picture to seeing now how everything should work." (Student Participant 2)

These comments illustrate the students' ability to conceptualise a holistic view of financial instruments, referred to as the connection of concepts (Baillie et al., 2013) that previously appeared to be unrelated.

Exposure to TC5 resulted in irreversible knowledge for Student Participant 4 (below), as he could interrogate the characteristics of debt and equity instruments and correctly determine the classification of the financial instrument as a financial asset, financial liability, or equity.

> "Shares can either be debt or equity…this is how I think now. You know that it is not always equity, you need to go and assess the characteristic." (Student Participant 4)

In summary, the five threshold concepts identified in this study illuminate the specialised knowledge in accounting embedded in a community of practice (Calduch and Rattray, 2022;

Walker, 2013). The integrated nature of these threshold concepts showcases how cumulative knowledge-building is required to master threshold concepts, including integrating knowledge within the discipline with the knowledge acquired in other disciplines. The student participants described the "troublesomeness" they initially experienced in understanding the threshold concepts' meaning and connecting with prior knowledge. Some student participants explained how they could move towards mastery of the threshold concepts when they understood the boundedness within the accounting discipline and the integration with other disciplines, such as finance. When drawing on their lived experiences, the student participants could practically apply the meaning of the threshold concepts. Given this transformative potential, threshold concepts are likely irreversible as they become difficult to unlearn. These findings illustrate that threshold concepts are integrative and that making patterns of concepts and practices visible to students is essential.

CONCLUSION

The utilisation of the TCF in accounting is well established (Schönfeldt et al., 2020; Magdziarz, 2016; Van Mourik and Wilkin, 2019; Weil and Mcguigan, 2010). In this study, the TCF was used to gain insight into the knowledge practices in accounting through the analysis of threshold concepts. The analysis showed the "boundedness" of the threshold concepts inextricably tied to understanding the principles and terminology within the specialised topic of financial instruments. Integrating the threshold concepts with prior accounting courses illustrates the hierarchical knowledge structure in accounting, where knowledge building is dependent on the formation of conceptual connections.

Exploration of the student participants' comments revealed that the disciplinary knowledge associated with threshold concepts was experienced as "troublesome". The analysis showed how the student participants encountered alien knowledge when attempting to identify the type of financial instrument, while conceptually difficult knowledge was encountered when calculating the carrying amount of a debenture, and troublesome language emerged from terminology such as "financial instruments". This supports the methodological approach that threshold concepts can be identified through the troublesome knowledge experienced (Quinlan et al., 2013). The impact of knowledge contextualisation on student participants was evident. For one participant, prior engagement with financial instruments resulted in familiarity with loan measurement principles. In contrast, limited exposure to financial instruments highlights the complexity of the discipline-specific language and the abstract nature of the threshold concepts that have little relation to the lived experiences of some student participants.

Student participants experienced varying levels of a "transformative" way of thinking when exposed to the threshold concepts in financial instruments. Conceptual shifts occurred when the threshold concepts were integrated with prior knowledge and knowledge acquired in other disciplines, such as Finance. When contextualising the threshold concepts with the practical world and linking these with their lived experiences, the students entered the liminal space of newfound ways of transformative understanding. Further, "irreversibility" occurred when the students could identify the connectivity of the meaning of a threshold concept (TC1) with existing knowledge and their lived experiences.

RECOMMENDATIONS

Accounting educators are encouraged to be more aware of threshold concepts when teaching a specialised topic. The findings emerging from this study point to the importance of linking the meaning of threshold concepts through scaffolding with prior knowledge within the discipline and knowledge from other disciplines in the field.

Threshold concepts challenge students to think critically and adopt new perspectives. Students know what crucial concepts they must master, and educators can structure their curriculum and assessments around these central ideas. By emphasising the integrative nature of threshold concepts, contextualising their meaning within the practice and linking this with students' lived experiences, educators support student learning as they emerge on newfound ways of understanding towards the mastery of a threshold concept.

Identifying threshold concepts supports providing clear learning objectives for educators and students. Engaging with these concepts leads to a deeper understanding of the subject matter as students develop a more sophisticated grasp of ideas' underlying principles and interconnectedness. Educators are encouraged to scaffold these concepts with prior knowledge in accounting and make these key components of disciplinary knowledge explicit within the context of students' language and lived experiences.

LIMITATIONS AND FURTHER RESEARCH

This study focuses on one specialised topic within the accounting curriculum and evaluates student participants' experiences of the threshold concepts within a limited timeframe. Instances of disciplinary knowledge experienced as troublesome or transformative may have occurred after the data collection phases. Other threshold concepts may be present in financial instruments (such as accrued interest) and in other specialised fields (such as accounting for leases). This study demonstrates to accounting educators the identification of threshold

concepts and how these concepts can become transformative and irreversible knowledge when framed within students' prior knowledge. Further research includes identifying threshold concepts in other specialised areas in accounting and investigating the challenges students experience in their conceptual ability to master the specialised field of knowledge and skills of the professional accountant. The flexibility offered by the TCF can aid education specialists in considering prior knowledge and students' lived experiences when developing a pedagogical approach and designing a curriculum for the education of accounting professionals.

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