An Exploratory Examination of The Threshold Concepts in Strategic Management

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Threshold concepts are core concepts in a field that students find particularly troublesome to understand, often because they integrate what students previously believed were discrete concepts or because they span boundaries between concepts or fields. Consequently, they are often transformative in nature and irreversible once fully understood. Therefore, they should form the core of our pedagogy.

Threshold concepts have yet to be identified in strategic management. In this exploratory study, we examine student perceptions to determine which strategy concepts are likely threshold and identify four candidates: vertical integration, corporate diversification, innovation, and governance. In addition, we identify three non-core concepts - PESTEL, global strategies, and the balanced scorecard – that possess threshold-like characteristics, suggesting we rethink their curricular value.

Finally, we identify active learning strategies that help students understand threshold concepts: applying/using the concept, discussing it with peers, and exploring examples. Class time devoted to such learning activities facilitates students "crossing the threshold."

Keywords: strategic management, strategy curriculum, threshold concept, threshold-like concept, core concepts, pedagogy

AN EXPLORATORY EXAMINATION OF THE THRESHOLD CONCEPTS IN STRATEGIC MANAGEMENT

The volume of strategic management knowledge has exploded (Bell & Rochford, 2020), creating a "stuffed" curriculum (Cousin, 2006) that faculty may feel compelled to teach in its entirety, burdening both them and their students with an increasingly vast amount of material (Lindsay, Jack, & Ambrosini, 2018) at a surface level. The alternative is carefully selecting specific topics to examine, compelling faculty to decide which concepts to include and exclude. Bell and Rochford (2020) argue that faculty should concentrate on the core concepts in the field, while Cousin (2006) advocates that faculty should focus on threshold concepts (a subset of core concepts that prove troublesome to students - Mick & Conners, 2018). If faculty focus on threshold concepts, they must understand both the nature of threshold concepts and

which core concepts are threshold. Additionally, because faculty have likely "crossed the threshold" and fully understand threshold concepts themselves, this understanding may impede them comprehending and empathizing with learner difficulty (Meyer & Land, 2006).

While Bell and Rochford (2020) identified the core concepts in strategy, threshold concepts in strategy have yet to be identified systematically. This paper explores threshold concepts in strategy and addresses this deficiency, enabling faculty focus. Prior studies in strategy and related fields have argued that several concepts are threshold. Table 1 summarizes possible threshold concepts that have been identified and presents the bases underlying the studies' authors' claims to thresholdness, ranging from atheoretic (Lindsay et al., 2018) to anecdotal (Bell & Rochford, 2016; Bolinger & Brown, 2015; Wright & Gilmore, 2012). We found no studies in these fields that identify threshold concepts systematically. Our paper seeks to fill this gap.

We proceed as follows: First, we review the threshold concepts literature so educators can better understand their critical importance in teaching. Next, we review how threshold concepts have been identified in strategy and related fields and compare and contrast those identification processes with methods presented by leading scholars in the threshold concept literature. Then, we outline our exploratory study, including our method for identifying threshold concepts in strategy, our sample, our analysis, and our findings. We discuss our findings and draw implications for teaching strategy.

WHAT ARE "THRESHOLD CONCEPTS"?

Threshold concepts are core or key concepts in a field (Davies, 2006; Meyer & Land, 2006) that transform student understanding (Meyer & Land, 2005); "portals" that open new worlds to the learner (Entwhistle, 2008). By "crossing the threshold," learners gain a new, deeper, and fundamentally changed conception of the concept (Meyer & Land, 2006). They possess five key characteristics (Meyer & Land, 2006). (Unfortunately, the literature is unclear whether a threshold concept must possess *all five* elements, or only several of them, which makes identifying them problematic.) The five characteristics are:

(1) *Transformative*: The learner's perception of a threshold concept changes fundamentally once they fully understand it (Meyer & Land, 2006), so they experience an "Ah Ha! moment." Lacking this transformation, it is difficult or impossible for a learner to progress further in their knowledge of the subject (Entwhistle, 2008). The transformation also changes the learner's perceptions of existing knowledge (Yip & Raelin, 2011). There is also an emotional element of dealing with the uncertainty of threshold concepts. "Students experience doubt and confusion about an aspect of [the concepts], which requires them to alter their perspective," transforming their world-view and identity (Hawkins & Edwards, 2015: 25).

(2) *Likely irreversible*: Once the learner grasps a threshold concept, it will be hard for them to forget or unlearn their new understanding and they will have trouble understanding the concept the way they formerly did. For example, Bell (2019) argued that once students understand sustainability as a business opportunity rather than a cost, they have trouble understanding why managers do not similarly see it as an opportunity. Students arrive at the new and transformed understanding by moving through a state of liminality when they begin to comprehend a new way of seeing and discard their old perspective, vacillating between old and new understandings (Meyer & Land, 2006). The liminality time period may be considerable (Meyer & Land, 2005). Students who fail to navigate through liminality and develop a transformed understanding may become "stuck" and engage in mimetic or ritualistic learning (Meyer & Land, 2005).

Part of the source of irreversibility of threshold concepts lies their integrative nature (described below). Because they bring together a learner's understanding about different phenomena that were previously perceived as conceptually distinct, it becomes hard to "go back" without "untying" the knowledge that is now seen as "tied together" (Yip & Raelin, 2011). Because of this irreversibility, teachers who themselves have "crossed the threshold" may experience difficulty comprehending learner difficulties (Meyer & Land, 2006).

(3) *Integrative*: When threshold concepts are properly understood, they reveal a previously hidden interrelatedness among other concepts (Entwhistle, 2008). This integrativeness makes the threshold concept inherently troublesome, partially because students tend to see concepts as distinct, so reconceiving them as interrelated may be counter-intuitive and a "denial of the world which the student experiences" (Davies, 2006), particularly if they previously learned the concepts as discrete, unrelated, and self-contained (Davies, 2006; Wright & Gilmore, 2012). Students may see concepts as discrete and unrelated because of the reductionist nature of science wherein scientists break down a phenomenon into its components to facilitate research (Poplin, 1988a, 1988b).

(4) *Possibly bounded*: The threshold concept may reveal conceptual boundaries between concepts. "A threshold concept helps delimit the boundaries of a subject because it integrates a particular set of concepts, beliefs and theories" (Davies & Mangan, 2007: 2). Each threshold concept may have its own terminal frontier (Meyer & Land, 2006) - a boundary where the concept does not hold or where it represents a transition to another field or concept. For example, there are situations where Newtonian physics does not hold, or where it transitions to quantum physics (Meyer & Land, 2006).

(5) *Likely troublesome*: Learners view threshold concepts as alien or counterintuitive (Meyer & Land, 2006; Wright & Gilmore, 2012), partially due to their integrative and transformative nature. Trouble arises because threshold concepts integrate other concepts that learners have previously understood as self-contained, and learners struggle to see how those other concepts fit together (Davies, 2006; Wright & Gilmore, 2012). Additionally, before students can integrate concepts, they must understand their constituent constructs, and after they have understood them, they need to see them in a new, integrated, way (Meyer & Land, 2006). Again, doing so may be difficult in part because of scientific reductionism (Poplin, 1988a, 1988b).

There has been discussion regarding which dimensions of the threshold construct are *necessary* and whether any are *sufficient* to identify a threshold concept. The emerging consensus seems to be that "troublesome" is necessary for a threshold concept, although this seems almost tautological because other dimensions of a threshold concept almost definitionally mean that threshold concepts will cause students trouble. Additionally, most scholars seem to regard "transformational" and "integrative" as necessary for the existence of a threshold concept. Entwhistle (2008) indicates that the transformative, irreversible, and integrative dimensions are *jointly* necessary for a threshold concept.

IDENTIFYING THRESHOLD CONCEPTS

To date, identifying threshold concepts has been done in one of two dominant ways. First, in many fields, threshold concepts have been identified in an ad hoc manner, wherein scholars argue that "concept X is threshold" and then (normally) present logic supporting that assertion. Second, several studies have employed the theoretical characteristics of threshold concepts to identify which concepts exhibit them. Studies sometimes, but not often, then seek to identify threshold concepts empirically in a given field.

Logic-Based Approaches to Identifying Threshold Concepts

Table 1 identifies three distinct methods of identifying threshold concepts in the literature. First, Lindsay et al. (2018) simply asserted that cultural diversity is threshold, but they present no logic or data to support this assertion. Clearly, this is deficient.

Second, two studies identified concepts that students find troublesome, and then use that troublesomeness to argue that the concept is threshold. Bolinger and Brown's (2015) study of entrepreneurial failure as a threshold concept in entrepreneurship is an example. They argue that because students fail to consider the emotional toll of failure, they have trouble understanding the concept, which makes it threshold. They also compare and contrast entrepreneurial failure with physiological pain,

conclude that these concepts are very similar, and then conclude that because Meyer & Land determined that psychological pain is threshold, so too is entrepreneurial failure.

Vidal, Smith, and Spetic (2015) used similar logic in examining the concepts of business ethics, corporate social responsibility, and sustainability. They argued that all these concepts are threshold in the business and society domain because they all conflict with the traditional (profit-maximizing) assumptions of the firm, causing students trouble. They also argued that because these concepts have been studied in isolation rather than together, this is further evidence that they are threshold in nature.

Third, two more studies identify troublesome concepts, and then review logically how they "stack up" on the other dimensions of threshold concepts. Irving and Wright (2019) examined evidence-based management (EBMgT) as a threshold concept and observed that many students find it troublesome. They then infer that EBMgT is counter-intuitive in part because many students believe management is simply "common sense." They further argued that understanding EBMgT may be irreversible. They conclude that EBMgT is threshold. Lamb, Hsu, and Lemanski (2020) examine the contextualization of Western management education (WME) as threshold. They argued that students become stuck regarding the contextual relevance of WME, suggesting it is troublesome. They subsequently argued that the contextualization of WME is also transformative, irreversible, and integrative.

Finally, several studies compare the construct under examination on multiple dimensions of thresholdness at the same time before drawing conclusions. Donovan (2017) examines "management as accomplishing results through people" as threshold by reviewing this concept against each of the five dimensions of a threshold concept and asserting that it exhibits all five dimensions. Nahavandi (2016) examines culture-as-meta-context (CAMC) as threshold. She argues that CAMC transforms student understanding, integrates theory and practice, and is troublesome to students, so is threshold. Finally, Yip and Raelin (2011) consider situational and shared leadership as threshold concepts. They used a somewhat different approach, employing participant observation, analysis of student papers, and in-depth interviews with students to identify these as threshold.

While these studies vary in the constructs they examine and the methods they use to identify threshold concepts, the one thing they share is their ad hoc nature - the authors found a concept that they believed are threshold, and then normally generated various evidence supporting that assertion.

TABLE 1
STUDIES THAT IDENTIFY THRESHOLD CONCEPTS IN STRATEGIC MANAGEMENT AND RELATED FIELDS

Author(s)	Year published	Discipline / focus of study	Threshold concept identified	Evidence to identify threshold concept
Bolinger & Brown	2015	Entrepreneurship	Entrepreneurial failure	The authors identified the troublesome nature of the "entrepreneurial failure" concept and argue that students do not understand especially the emotional toll of failure as well as the learning opportunities it provides. They compare and contrast this with physiological pain, which Meyer & Land (2005) identified as threshold.

Author(s)	Year published	Discipline / focus of study	Threshold concept identified	Evidence to identify threshold concept
Donovan	2017	Management	Management as accomplishing results through people	The author reviews each of the five dimensions of a threshold concept and argues that "managing as accomplishing results through people" evidences characteristics of each of the five dimensions.
Irving et. al.	2019	Management	Evidence-based management (EBMgT)	They note that many management students perceive the concept as troublesome, and they infer it is counter-intuitive. They also say EBMgT writings "hint at its potential irreversibility." (p. 360)
Lamb, et. al.	2020	Management	Contextualization of Western management education (WME)	The authors argue that both students and instructors may become "stuck" regarding the contextual relevance of WME, and that it is therefore troublesome. They then argue that it is also transformative, irreversible, and integrative.
Lindsay, et. al.	2018	Strategic management	Critical diversity	The authors provide no logic. They simply state that it is one.
Nahavandi	2016	Management	Culture-as-meta-context	The author argues that culture as meta context exhibits characteristics of transforming student understanding, integrating theory and practice, and being troublesome, so is threshold.
Vidal, et. al.	2015	Business & Society	Business ethics, CSR, sustainability	The authors argue that these concepts conflict with the traditional (profit-maximizing) view of the firm, and they have been studied in isolation.

Author(s)	Year published	Discipline / focus of study	Threshold concept identified	Evidence to identify threshold concept
Yip & Raelin	2011	Leadership	Situational leadership & shared leadership	The authors used an ethnographic approach wherein one of the authors (a doctoral student, at the time) participated in a leadership class offered by the second author. They used participant observation, analysis of student papers, and in-depth interviews with students in the class to identify the threshold concepts.

Empirical Approaches to Identifying Threshold Concepts

Our review of the literature identified five papers that developed a more holistic approach to identifying threshold concepts. Several of these papers (see Table 2) relied extensively on student data to identify threshold concepts.

TABLE 2
PAPERS IDENTIFYING A SYSTEMATIC METHOD OF IDENTIFYING THRESHOLD CONCEPTS

Author(s)	Year published	Domain in which threshold concepts are identified	Recommended method to identify a threshold concept
Barradell	2012	Review of previous studies identifying threshold concepts	The author reviewed how others have identified threshold concepts and have determined there are three predominant methods: "informal, semi-structured, phenomenographic interviews… questionnaires, surveys, short answer problems and review of old examination papers… and observation of classroom behaviour" (p. 269). (We review each of the articles she cites separately.) From this, she concludes that it is necessary to collaborate with both academics and students to identify threshold concepts and understand the experiences of the learners.

Author(s)	Year published	Domain in which threshold concepts are identified	Recommended method to identify a threshold concept
Davies	2012	Theory paper examining how to identify threshold concepts	The author suggests a threefold approach for scholars to identify threshold concepts: ● Compare how novices and experts analyze a problem as a way to identify threshold concepts used in solving that problem. ● Look for whether understanding the concepts changes the learner's self-identity. ● Look for whether understanding the concepts changes the learner's self-awareness.
Knight, et. al.	2014	Engineering	Developed a "triangulation approach," wherein they examined data provided by two teachers who completed a conceptual analysis of the course, several sources of student data (examining written reflections, focus groups, and a class exercise) to identify threshold concepts. Among other things, students were asked, "What topic or concept has been the most challenging to you so far?" (p. 129)
Male & Baillie	2011	Engineering: Proposes a method to identify threshold concepts	The authors used a two-stage method: Stage 1: interviews and focus groups with students, tutors, and academics, and Stage 2: negotiations among participants to attain consensus on threshold concepts.
Quinlan, et. al.	2013	A comparison of 3 case studies	The authors argue that the "best" way to identify threshold concepts is dependent on the nature of those concepts. When troublesomeness is the critical factor, a focus on empirical studies examining what students find most difficult is appropriate. If integration is the key characteristic, then a survey of key principles is appropriate. They suggest that other (unidentified) methods could be used to identify threshold concepts where one or more of the other three dimensions is most salient.

Barradell (2013) reviewed previous studies examining threshold concepts and identified three primary methods other scholars have used to identify them: interviews, surveys, and classroom observation of student behavior. Similarly, Knight, Callaghan, Baldock, and Meyer (2014) in their engineering study developed a "triangulation approach" where they examined data provided by educators and multiple sources of student data. Male and Baille (2011) adopted a similar approach, with the twist that after they interviewed students, academics, and tutors, they engaged in a negotiation process among the participants to generate agreement on the threshold concepts.

In contrast, Davies (2012) suggested a somewhat different (three-fold) approach: (1) Compare how novices and experts analyze a problem. Significant differences in approaches suggest a threshold concept. (2) Look for whether a change in the student's self-identity occurs when they grasp the concept. If so, it's threshold, and (3) Look for whether a change in the student's self-awareness occurs when they grasp the concept. If so, that also indicates we are dealing with a threshold concept.

Finally, Quinlan et al. (2013) argued that the "best" way to identify threshold concepts depends on their nature. If troublesomeness is the critical factor, then we should look primarily at what students find most difficult to understand. If integration is the seminal dimension, then we should "survey principles."

Some Conclusions From the Extant Studies

While many studies have developed ad hoc procedures to identify threshold concepts, others have employed a more holistic, empirical approach involving students and their learning experiences. Many studies began with the troublesome nature of threshold concepts. Troublesomeness combined with transformation may work well with data collected from students because students are better able to identify concepts that give them trouble or when their understanding was transformed ("I had an 'Ah Ha!' moment and then saw the world in a new light.") than they are to identify irreversible concepts ("I just can't get my head around my old way of thinking"). Therefore, having students identify troublesome or transformative concepts seems a productive way to identify threshold concepts more systematically.

OUR STUDY EXPLORING THRESHOLD CONCEPTS IN STRATEGIC MANAGEMENT

The remainder of our paper discusses our empirical investigation into the threshold concepts in strategy. We build upon Bell & Rochford's (2020) paper that identified core concepts in strategy, because threshold concepts are a subset of core concepts (Davies, 2006; Meyer & Land, 2005). We invited approximately 240 undergraduate students at a medium-sized Midwestern university to participate in our study as they approached the end of their capstone strategy course, and 69 responded to our invitation. Choosing students who had nearly completed their strategy course ensured that they were familiar with course material, and that it was fresh in their memories.

Data and Methodology

In conjunction with the preparation of his strategic management textbook, Dr. Frank Rothaermel developed a detailed list of concepts common across strategy textbooks (Rothaermel, 2013). We used his list as the basis for gathering our data on 23 major course concepts (Rothaermel, 2013) and used the data we gathered on these concepts to examine student understanding of and difficulty with strategy concepts. Fortunately for us, Bell and Rochford (2020) recently published a paper identifying the core concepts in strategy, which we were able to build upon in this paper. (Table 3 lists all concepts identified by Rothaermel (2013) as well as a breakdown of whether or not each concept was core based on Bell & Rochford's analysis.)

TABLE 3
LIST OF CONCEPTS EXAMINED BY ROTHAERMEL'S ASSESSMENT OF STRATEGY TEXTS

Concepts examined by Rothaermel that are core according to Bell & Rochford	
	Business level (Porter's generic) strategies
	Competitive advantage
	Corporate governance
	Corporate diversification
	Mergers & acquisitions
	Vertical integration
	Porter's five forces
	Strategic alliances
	Organizational structure
	Resources & capabilities
	Mission, objectives, vision
Concepts examined by Rothaermel that are not core according to Bell & Rochford	
	Balanced scorecard
	Business ethics
	Environmental sustainability
	Global strategy
	PEST/PESTEL
	Stakeholder theory
	Strategic groups
	Strategic leadership
	Strategic management process
	SWOT
	Types of innovation
	Value chain

Because the literature discussing how to identify threshold concepts focused on the importance of student involvement, we surveyed students to determine which core strategy concepts they had difficulty with, to what extent they felt they had mastered their understanding of them, and whether they experienced any "ah-ha!" (i.e., transformational) moments.

Generating the Potential Threshold Concepts

Bell and Rochford (2020) identified core concepts in strategy by comparing and reconciling concepts from both the pedagogical and academic strategy literature. They generated a list of nine core concepts: (1) Competition / competitive dynamics, (2) Organizational direction (planning, goals, vision, mission, values, and objectives), (3): Industry structure / 5-forces, (4) Business level strategies, (5) Organizational capabilities / RBV grouped together with organization and structure, (6) Interfirm relationships / networks / strategic alliances, (7) Firm growth, including diversification, vertical integration and the value chain, and mergers & acquisitions, (8) Organizational change and innovation, and (9) Corporate governance.

The Student Questionnaire and Sample

We developed a questionnaire that we administered to strategy students as they neared completion of their strategy course (either the last week of semester or finals week). We pretested our questionnaire with a small sample (n=13) of students who had either completed the strategic management course the prior semester or had completed all but the final exam for the class. We recruited them with flyers and

announcements in strategy class sections and offered pizza and soda plus a chance to win a $50 gift card for answering the questionnaire. Students answered the survey on their own laptops. One of the authors (who had not taught the students) explained the consent process and answered students' questions. Based on students' feedback, we made minor revisions to both our questionnaire and our process for administering it, and then developed it in Qualtrics. (The final survey instrument is available from the authors on request.)

For the actual data collection, we recruited students from our School's strategy classes, both sections offered by one of the authors and by several other faculty unaffiliated with the study. We offered participants a chance to win a $50 gift card for completing the questionnaire. As a result, students were volunteers who were neither compelled to participate as part of the class nor were participating to receive class-based incentives (such as extra credit).

We invited students from a total of six sections of strategic management (approximately 240 students) to participate over the period from the end of spring semester 2019 to end of spring semester 2021. In total, we received 69 questionnaires providing usable information, approximately a 29% response rate. While this is relatively low, it is understandable given that we sought students participation at a very busy time of their college careers.

RESULTS

Table 4 assesses student understanding of course concepts that are closely aligned with Bell & Rochford's (2020) list of core concepts. For each concept, we report the percentage of students who rated the concept as "very" or "extremely" difficult to understand at the end of the course, the percentage of students who, at the end of the course rated their current understanding of the concept as "somewhat" or "not at all," and finally the percentage of students at the end of the course who rated their understanding of the concept as "well" or "very well."

TABLE 4
LEVEL OF STUDENT DIFFICULTY UNDERSTANDING CORE CONCEPTS IN STRATEGY

Concept identified (core concept identified by Bell & Rochford shown **in bold**)	Total percent of respondents rating concept as "very" or "extremely" difficult	Percent of respondents rating *current* understanding of concept as "somewhat" or "not at all"	Percent of respondents rating *current* understanding of concept as "well" or "very well"
Business-level generic Porter) strategies			
Business level (generic, Porter) strategies	10.45%	19.12%	36.76
Competition / competitive dynamics			
Competitive advantage	1.47%	0%	78.27

Corporate governance			
Corporate governance*	29.69%	40.63	25%
Growing the firm…			
Corporate diversification*	10.29%	40.63%	43.47
Mergers & acquisitions	26.47%	11.59	43.48
Vertical integration*	20.9	27.54	33.34
Industry structure / Porter's 5 forces			
Porter's Five forces	22.06	17.39	46.37
Interfirm relationships			
Strategic alliances	16.42%	8.7%	52.17
Organizational capabilities…			
Organizational structure	13.43%	10.15%	56.52
Resources & capabilities	9.23%	7.47%	56.72
Knowledge creation and innovation			
Types of innovation & strategic implications*	14.93%	26.09	36.23
Organizational direction			
Mission, objectives, values	4.41%	5.8%	71.02

*These concepts are potentially threshold concepts

Types of Concepts

There appear to be four distinct types of concepts. The first ("easy" concepts) are those such as competitive advantage where few students (about 1.5% in this case) said the concept was difficult to understand, and by course-end many more students report having a good rather than a poor understanding of the concept. The second category ("difficult" concepts) consists of concepts such as Porter's 5-Forces where a significant percentage of students (>20% in this case) reported that the concept was difficult or very difficult to understand, but that by the end of the semester, far more students reported having a very good grasp of the concept (>45% here) than a poor (about 17%) grasp. This pattern indicates that with perseverance, students will be able to grasp and understand difficult concepts. The third group of concepts, which we call "seemingly easy, yet misunderstood concepts," are those like corporate diversification where there is an apparent discrepancy - relatively few students (10% here) say the concept is difficult, yet over 40% reported that they didn't understand the concept at the end of the semester. Conversely, a similar

percentage say they *did* understand the concept, suggesting that there may be an "Ah Ha!" moment when their understanding changes. The fourth category is "difficult and misunderstood concepts." A substantial group of students indicate the concept is difficult and understanding of the concept is split. For example, for vertical integration strategies, 20% of students report it was hard, 28% say they had trouble understanding it at the end of the semester, while about a third report a good understanding. Again, this category may require a transformative, "Ah Ha!" moment to fully understand these concepts.

Overall, this suggests that strategy concepts divide into two fundamental types: "Normal" concepts that students can understand with or without significant work (difficult and easy concepts, respectively), and potentially threshold concepts where students seem badly split on their understanding of the concept at the end of the semester. Therefore, there may be several candidates for "threshold concept status" amongst the concepts listed in Table 4, indicated with an asterisk, including corporate governance, corporate diversification, vertical integration, and types of innovations and strategic implications thereof.

In addition, we also sought student input about concepts that Rothaermel (2013) identified that Bell and Rochford (2020) did *not* identify as core. As with the core concepts, we asked students about the perceived difficulty of the concepts, as well as their understanding of the concepts by the end of the semester. The results are presented in Table 5.

TABLE 5
LEVEL OF STUDENT DIFFICULTY UNDERSTANDING NON-CORE CONCEPTS IN STRATEGY

Non-core concept identified by Rothaermel	Total percent of respondents rating concept as "very" or "extremely" difficult	Percent of respondents rating *current* understanding of concept as "somewhat" or "not at all"	Percent of respondents rating *current* understanding of concept as "well" or "very well"
Balanced scorecard	26.31	48.33	13.33%
Business ethics	9.1%	5.88	72.06
Environmental sustainability	9.09%	7.46%	70.15
Global strategy	26.86%	26.87	34.33%
PEST/PESTEL	21.22	28.36	32.84
Stakeholder theory	18.46	34.33	28.36
Strategic groups	5.97%	29.41	32.35
Strategic Management process	11.94%	22.06%	27.94
Value chain	12.12%	16.42%	47.76
Strategic	13.23%	10.14%	50.72

Non-core concept identified by Rothaermel	Total percent of respondents rating concept as "very" or "extremely" difficult	Percent of respondents rating *current* understanding of concept as "somewhat" or "not at all"	Percent of respondents rating *current* understanding of concept as "well" or "very well"
Balanced scorecard	26.31	48.33	13.33%
Business ethics	9.1%	5.88	72.06
Environmental sustainability	9.09%	7.46%	70.15
Global strategy	26.86%	26.87	34.33%
PEST/PESTEL	21.22	28.36	32.84
Stakeholder theory	18.46	34.33	28.36
Strategic groups	5.97%	29.41	32.35
Leadership			
SWOT	1.49%	0%	85.3

While there are many "normal" concepts (for example, less than 2% of respondents said SWOT was difficult, none said they lacked understanding of the concept at the end of the course, and 85% said they understood SWOT "well" or "very well" by the end of the course, other non-core concepts evidenced threshold-like characteristics. (We say "threshold-like" because the fact they are *not* core excludes them as threshold concepts.) For example, more than a quarter of respondents stated that the balanced scorecard was "very" or "extremely" difficult, and almost half said that they understood it "somewhat" or "not at all" by the end of the course, meaning many or most students ended the course with a poor understanding.

What Are the Characteristics of Concepts Evincing "Ah Ha!" Moments?

To examine in more detail the characteristics of threshold or threshold-like concepts, we looked at incidents where students reported that they had an "Ah Ha!" moment in the class. That analysis is reported in Tables 6a, 6b, 6c, and 7.

We asked students whether they experienced a moment during the course when things that previously seemed hard to understand suddenly became clear. These results are summarized in Table 6a. Most respondents, almost 83%, experienced an "Ah Ha!" moment. We are unable to conclude whether those who did not was because they never had a sudden revelation but more of a gradual understanding or whether they just struggled and never attained clarity.

TABLE 6A
AH HA!!! MOMENTS

Were there any moments during your Strategic Management class when you had an "Ah Ha!!" moment– that is, a time when things that previously seemed hard to understand suddenly became clear to you?

"Ah Ha!!" moment?	Percentage of respondents	n
Yes	82.61%	57
No	17.39%	12

Of those students who had an "Ah Ha! moment," most say it occurred when they applied or used the concept (Table 6b). One respondent indicated that the concept became "a lot more clear when I got to apply it and use it for a company in the final case." In most cases, this transformed understanding involved examples, discussion, and/or visualization. Students found that discussion with facilitates "Ah Ha! moments." One student reported that their "Ah Ha! moment" came while working on a group project with their group members. Pointedly and tellingly, no one mentioned merely listening to a lecture as a trigger for a breakthrough. Thus, it appears that breakthroughs or transformations occur in active learning situations, particularly when students apply and/or use the concept, when they discuss it with peers, see a model of it, or have an example presented by their professor, or while they read about the concept.

TABLE 6B
CAUSES OF "AH HA!!" MOMENTS

Application and/or Use	**Self-thought & reflection, examples**	**Discussion With others or in class**	**Seeing a model, visualizing**	**Reading**	**Example from professor**	**Examples (other)**
6	2	4	4	4	4	2
23%	8%	15%	15%	15%	15%	8%

Note:
Not all respondents explained what created the Ah Ha!!! moment. Out of the 57 respondents that said they had an "Ah Ha!!! moment", 50 provided responses. However, almost half of these responses were unusable as the respondent may have just listed the concept (e.g., "PESTEL") or defined a concept but not what contributed to the breakthrough.

Those "Ah Ha!" moments occurred with many different core and non-core concepts (see Table 6c). While we did not ask students to identify the concepts with which they had such a moment, many students did so. Of the core concepts, competitive advantage, vertical integration, and Porter's 5-force model each garnered four mentions as concepts generating "Ah Ha!" moments. This is not particularly surprising. For example, students often begin the course believing competition involves "being the best" rather than being unique (Porter, 1996), and discussing Porter's conception of competition as being unique transforms their understanding. Similarly, vertical integration is often problematic for students, and they have trouble understanding it as a position on the value chain. Relatedly, students often confound the force of buyers and suppliers in Porter's 5-force model, indicating a common problem understanding value chain location. Additionally, vision received three mentions, and mergers and acquisitions and alliances (two topics related to firm growth modes) each received two. Innovation and the RBV each received one mention.

TABLE 6C
CONCEPTS THAT STUDENTS SPECIFICALLY INDICATED THEY HAD AN "AH HA!" MOMENT

Concept	Number of specific mentions
Core concepts	
Competitive advantage	4
Mergers & acquisitions	2
Vertical integration	4
Porter's 5 forces	4
Strategic alliances	2
VRIO / RBV	1
Innovation	1
Vision	3
Non-core concepts	
PESTEL	6
SWOT	4
Global strategies	1

Interestingly, only three non-core concepts were mentioned by students. PESTEL analysis received 6 mentions, SWOT 4, and global strategies one. In some ways, this makes sense, as one would hope that non-core concepts would be less problematic. However, the fact that PESTEL and SWOT received significant numbers of responses may indicate that understanding them requires a fundamental transformation. Indeed, Bell and Rochford (2016) previously intimated that SWOT may be threshold because it is often taught as "four buckets" rather than as an integrative concept (Bell & Rochford, 2016).

Table 7 summarizes the results of an open-ended question we asked about why particular important concepts were difficult to understand. We grouped these open-ended responses into categories or themes. For example, students reported having difficulty with concepts such as Porters 5 Forces, where they came into the class with a preexisting idea of the concept that differed from what was presented in class, so students had to "unlearn" and then relearn it.

TABLE 7
THEMES FOR WHY STUDENTS THOUGHT THE CONCEPT WAS IMPORTANT AND DIFFICULT

Themes	Examples	Number of mentions
1. Prior conflicting information	Came into the class with a different idea of what the concept was about	4
2. Difficulty in application	I felt as though we discussed this topic relatively frequently but it was hard for me to be able to apply the concepts discussed if asked to in a paper.	6
3. Many different forms of the concept. Hard to differentiate between concepts	Having so many variations and iterations made it hard to understand at first	14
4. Number of component parts	There are several small pieces that make up the whole concept which were easy to get confused/mixed up. It's a pretty large concept with multiple parts and can be applied in many ways. It seems like we went through it all at once but might have been better to do it chunks at a time.	13
5. Hard to visualize	Hard to remember and visualize	1
6. A lot to do		3
No useful response	Defined the concept, or only talked about the importance of the concept, or irrelevant response (I was sick that day) or no response.	30

Most of the responses appeared in two categories or themes. The first of these themes was that of the concept having many different forms or that it was hard to differentiate between concepts. For example, students said of strategic alliances, "There were so many different forms of alliances as well as concepts to understand surrounding it. It was just hard to grasp." Students reported that PESTEL and its variants, had "so many variations and iterations [that] made it hard to understand at first." These types of responses suggest that the concept is difficult to understand because it is hard to distinguish between the concept and other related concepts, and what is included in and excluded from the concept. In other words, such concepts exhibit "boundness."

The other category or theme of responses that garnered multiple responses was concepts with multiple component parts that made them hard to understand. For example, a student reported that "there are several small pieces that make up the whole concept which were easy to get confused/mixed up," suggesting that students find concepts difficult when they build on smaller components into a whole, integrated concept. This suggests that such concepts are "integrative," and this is challenging for students until they cross the threshold and understand how the parts combine to form the whole.

Students also provided comments under the theme of difficulty in application. Being able to use and apply the concept was the third most mentioned issue. For example, a student wrote that the value chain "was hard to grasp because I was having a hard time grasping how to use it within our project."

In some instances, students were just overwhelmed with a concept when there was "a lot to do" or they had a hard time visualizing and therefore understanding the concept.

TABLE 8
CONFIDENCE IN HANDLING STRATEGY RELATED ISSUES

How confident are you that you have the skills to respond to a strategy-related issue at your workplace?	Percentage of respondents	n
Very confident	34.33%	23
Somewhat confident	59.70%	40
A little bit confident	5.97%	4
Not at all confident	0	0
I am not currently working	0	0

Finally, we were also interested in determining how students felt about their overall abilities. We asked students: "How confident are you that you have the skills to respond to a strategy related issue at your workplace?" More than a third of students said they felt "very confident" in their ability. An even larger percentage felt "somewhat confident." A very small percentage, fewer than 6%, felt "a little bit confident" and no one reported that they were "not at all confident." This sense of confidence in their abilities was also reflected in students' expectation of their final grade in the class with more than 94% of respondents expecting to achieve an A or B in the class. This confidence in a high grade may have arisen because students who felt they could afford the time to volunteer to complete the survey during the last week of class may well have been students who expected to perform well. To verify this, we reviewed the grade distribution of students in one of the author's sections of the course taught during the period during which we gathered our data. During that time, just under 75% of all students in the author's classes received grades of A or B, which is 15-20 percentage points lower than our respondents anticipated, which lends credibility to our idea that student expectations reflect our recruitment methods.

TABLE 9
EXPECTED GRADE

Expected grade	Percentage	n
A grade range	60.61%	40
B grade range	33.33%	22
C grade range	6.06%	4
D grade range	0	0
F grade range	0	0

MOVING TOWARD IDENTIFYING THRESHOLD AND THRESHOLD-LIKE CONCEPTS IN STRATEGIC MANAGEMENT

To identify possible threshold concepts in strategic management, we combine our analysis of difficult concepts (Table 4) and core concepts where students experienced an "Ah Ha!" moment (Table 6c). We consider categories three ("easy yet misunderstood" concepts) and four ("hard and misunderstood") as likely threshold concepts. There are two concepts - vertical integration and innovation - where students both identify having an "Ah Ha!" moment and where they report the concept as being difficult and there are significant numbers of students who have a deep lack of understanding at the end of the course. Therefore, it appears that these two concepts are threshold in nature.

In contrast, the easy concepts – competitive advantage, the VRIO/RBV, and vision – were concepts that, while students indicated a transformation of understanding, were not inherently difficult to understand or had significant numbers of students who failed to understand at the end of the semester, suggesting they are *not* threshold in nature.

Mergers & acquisitions, Porter's five forces, and alliances are hard concepts. Students indicated they had "Ah Ha!" moments, but there was apparent understanding of them at the end of the semester. Again, this suggests that they are *not* threshold, because by the end of the semester, students have a good understanding of them.

Finally, this leaves corporate governance and corporate diversification as particularly thorny concepts. With both of them, students reported very split understandings of them at the end of the course, and with governance, many students also rated it as "very" or "extremely" difficult. Despite that, *no* students reported having an "Ah Ha!" moment with either concept. Perhaps this indicates that students failed to transform their understanding of these concepts even by the end of the course, suggesting that they too are threshold in nature.

This suggests that there are four distinct threshold concepts in strategy - vertical integration, corporate diversification, innovation, and corporate governance. In addition, vertical integration and corporate diversification, coupled with mergers and acquisitions can be viewed as a combined "firm growth strategies" core concept which in totality may also be threshold.

If we turn briefly to the non-core concepts, we see that while multiple students identified having an "Ah Ha!" with global strategies, PESTEL, and SWOT, by the end of the semester most students reported having a good understanding of SWOT, while understanding of global strategies and PESTEL was still badly split (for global strategies, almost 27% reported a poor understanding while over a third reported a good understanding, and almost 27% reported it as a difficult concept, and for PESTEL, 28% indicating they had little understanding, and almost 33% indicating a good understanding, and over 20% reporting it was very hard to understand). This suggests that both of these concepts are "threshold-like" in nature. We

use this term because they are *not* threshold because they are not core, but they share many similar characteristics as threshold concepts. Similarly, while no students reported having an "Ah Ha!" with the balanced scorecard, it was perhaps even more of a threshold-like concept than these others, as over a quarter of respondents indicated it a difficult concept, almost half said they still had little understanding at the end of the semester, and fewer than 15% understood it well.

DISCUSSION

Identifying the Threshold Concepts in Strategy

The importance of threshold concepts to student understanding is becoming apparent to educators. Especially because of their integrative, transformative, and troublesome nature, identifying them allows educators to focus student attention on core concepts that are most likely to be difficult for students to understand. In addition, identifying non-core concepts that share many of the characteristics of core concepts allows educators to question whether including them in the curriculum, given the time and effort required for students to understand them, is worth the effort. Therefore, being able to identify the threshold and threshold-like concepts allows educators to focus students' scarce time and attention on understanding these troublesome concepts.

In this exploratory study, we systematically examined the threshold concepts in strategic management, and in doing so, identified four strategy concepts likely to be threshold. Our paper further advances understanding of how to identify threshold concepts by surveying students to better understand their perceptions of which concepts are difficult and when they experienced "Ah ha!" moments that may be characteristic of the transformational nature of threshold concepts.

We found many "normal" concepts such as Porter's "generic" strategies or competitive advantage that students perceive as "easy" to understand, and that most students understand of by the end of the course. These "normal" concepts also include difficult concepts such as mergers & acquisitions that students believe are difficult to understand, yet by the end of the course, most students comprehend them.

We term these "normal" concepts because they follow normal assumptions of student learning - students understand them through studying. However, we also identified several concepts that were unlike that. For example, students believe that corporate diversification is relatively easy, yet students are relatively evenly split between those who believe they understand the concept and those who do not. There are other concepts such as corporate governance and vertical integration that students characterize as difficult, and where course-end understanding is similarly split. Interestingly, several students report having "Ah ha!" moments with these concepts, suggesting that students possibly develop sudden understanding. Therefore, it is likely that governance, diversification, vertical integration, and innovation are threshold to strategy.

Problematically, students are not likely to understand these concepts merely by studying harder. Rather, the educator needs to develop and design experiences helping students "cross the threshold" and transform their understanding. Much of the time, this occurs during an experiential learning exercise, application-based examples, discussion with other students, and sometimes through student reading and self-reflection. Though it seems somewhat obvious in retrospect, *no* students reported that they experienced this during a lecture. Hence educators need to carefully curate a set of experiences that help students cross the threshold.

What About Threshold-Like Non-Core Concepts?

In addition to examining the core concepts identified by Bell & Rochford, we also examined a broader set of strategy concepts identified by Rothaermel. While many of these concepts (such as business ethics) appear to be normal concepts, others (such as the balanced scorecard) evidenced threshold characteristics. Because they are *both* non-core *and* threshold-like, we wonder about the advisability of retaining them in the curriculum. Because they are peripheral, yet require an experiential approach to produce student understanding, educators should think carefully about whether they are "worth" the time and effort required to generate student understanding, or whether it is more advisable to drop them from the curriculum.

What Makes a Concept "Difficult"?

In addition to examining when and why students experienced "Ah ha!" moments, we also sought insight into why students find some concepts difficult. We found four distinct themes. First, students found it difficult to understand concepts having many component parts (for example, PESTEL). This speaks to the integrativess of threshold concepts - they tend to bring together 3 concepts into a coherent whole, and that process engenders perceived difficulty.

Perhaps related to that, students found concepts difficult to understand when there were different forms of the concept, or it was hard to distinguish between concepts. This speaks to boundedness: Students experience difficulty when they cannot readily determine whether "this is X, or something related to X, and how do I tell them apart?"

A smaller number of students reported difficulties applying a concept to a specific situation. This does not seem to be related to threshold concepts per se but given that students also reported that application of concepts helped them generate "Ah ha!" moments, this suggests that student understanding is facilitated by having students apply concepts to "real world" situations, such as case analyses.

Finally, students reported having difficulty understanding concepts when the information they received in class conflicted with information they received previously in other classes. In these situations, they first had to unlearn preexisting understanding before they could gain new understanding. This suggests that educators must identify *where* students are developing this (mis)understanding and working with faculty in those areas to redesign that curriculum.

Other Important Issues Raised

More broadly, our examination of threshold concepts in strategy leads to several broader important questions: Are threshold concepts obvious to educators? What role does identifying thresholds play in teaching and curriculum development? And what role do threshold concepts have in assessment of student learning? We address each of these questions in turn.

Are Threshold Concepts Obvious to Educators?

Extant threshold concept literature seems to presume that educators have themselves "crossed the threshold" for threshold concepts in their field, and thus understand both the threshold concepts in their field and the nature of those concepts, at least at an intuitive level (Landrum, 1993). While this assumption may hold for experienced faculty holding doctoral degrees, it may be much less true for younger, less experienced faculty, and even less so for contingent faculty (terms and adjuncts) who possess only an MBA degree with only a single strategy course. (For example, adjuncts who teach strategy at our school holding an MBA from our University and an undergrad degree in a non-business discipline will have only a single strategy course.) Such contingent faculty may be much less likely to have understood and crossed the thresholds that PhD-trained faculty take for granted. Therefore, formal articulation of threshold concepts in a discipline and helping all faculty understand them and develop teaching strategies to address them is increasingly important with the increase in contingent faculty. Conversely, while "veteran" faculty may better understand the threshold concepts in their discipline at least implicitly (Landrum, 1993), they may have taught the strategy course so long they have forgotten how "troublesome" threshold concepts can be for students, and so they too may benefit from formal identification of threshold concepts in the discipline.

The Role of Threshold Concepts in Curriculum Development

Identifying threshold concepts in a field should help propel curricular development in that field and related fields. At a bare minimum, educators should think carefully about allocating more time and attention to threshold concepts and less time and attention to normal concepts. Given the stuffed curriculum (Cousin, 2006), decisions about curricular emphasis are critical to student success. For example, given that competitive advantage is an "easy" "normal" concept, it may be far less important to spend a lot of classroom time on it, allowing freed-up time to be devoted to threshold concepts such as corporate governance. Similarly, given the threshold-like nature of several non-core concepts (such as the balanced scorecard and global strategies), it may be worthwhile revisiting whether they should be retained in the

curriculum, or whether they should be dropped, allowing more time to focus on core and especially threshold concepts.

Student understanding of threshold concepts is often enhanced by "scaffolding" - introducing them in one course, and then building on that scaffold in other subsequent courses (Hmelo-Silver, Duncan, & Chinn, 2007). While this seems problematic with classes such as strategic management where students take a single course, some threshold concepts might be introduced in earlier courses that are normally prerequisite to strategy (such as Principles of Management). However, doing so is not trivial. First, it requires that educators teaching these related courses have themselves developed a threshold understanding of the concept. While we are aware of no study examining this, it seems likely that faculty teaching in a "related" discipline are less likely to have crossed the threshold than are faculty teaching in the "primary" discipline. Second, when scaffolding a concept, it is imperative that the faculty member not simply "dumb down" the concept because doing so encourages ritualistic learning that is subsequently difficult to change (Meyer & Land, 2005). Third, this proposed scaffolding will require a level of integration across courses that may be difficult to generate.

For example, Bell and Rochford (2016) discussed the threshold nature of SWOT analysis. Part of the problem is that the original integrative nature of SWOT, tying internal firm resources to the external environment, was lost over time and people began teaching and learning SWOT, particularly in Principles of Marketing or Principles of Management classes, as a set of discrete "buckets" (Valentin, 2001). Therefore, the first and difficult task facing strategic management faculty is helping students unlearn their earlier understanding so they can appreciate SWOT's integrative role.

Finally, it seems important to think about how best to teach threshold concepts, especially given that the "Ah ha!" moments that may produce transformed understanding seem to be generated by experience or application. For example, we have identified innovation strategies as likely threshold in strategy. Rather than teaching this concept via lecture (which may encourage students to learn it mimetically and ritualistically, memorizing rather than internalizing the information), educators may use a case or an experiential learning exercise on innovation designed to help students better understand innovation, such as a new product development exercise (Keene, 2017) or a design thinking exercise (Armstrong, 2016; Foster, 2021; Spivack, 2020; Stock, Bucar, & Vokoun, 2018). Moreover, it behooves educators to share our innovative teaching methods with our colleagues via outlets such as the *Academy of Management Teaching & Learning*, the *Journal of Management Education*, or *Management Teaching Review*, depending on the nature of our research.

Threshold Concepts and Assessment

It is almost a truism that faculty are spending increasing time and effort in assessment activities. However, there has been virtually no discussion of the role of threshold concepts in assessment activities. Burch, Burch, Bradley, and Heller (2015: 481) provides a partial exception to this. They state that educators need to design their assessments "to ensure that the student has met the desired level of understanding." Given the critical role threshold concepts play in student understanding (or lack thereof), they should play an important role in assessment of learning outcomes (AoL). Designing assessment to "ensure the student has the desired level of understanding" becomes a key element of the process.

To accomplish this, it seems necessary that the chosen assessment tool differentiates between surface or mimetic learning (Meyer & Land, 2005) and transformed learning. Therefore, assessing threshold concepts should occur at a relatively high level of Bloom's taxonomy (analyzing, evaluating, creating, and - maybe - applying) rather than at a low level (remembering, understanding, and - maybe - applying). Students who have engaged in mimetic or ritualistic learning may successfully remember the definition of a threshold concept or evaluate something based on it, but it seems unlikely they would be able to analyze or evaluate a situation when doing so requires a transformed understanding of the concept. Therefore, higher-level assessment should be more effective at assessing whether or not the student has crossed the threshold and accurately understood the concept.

At a broader level, acknowledging threshold concepts may help direct educators' attention as they develop assessment tools. Clearly, assessment should be targeted toward student understanding of core concepts in the field, and especially threshold concepts. Because normal concepts are quite straightforward to students, relatively less emphasis can be placed on assessing them compared to threshold concepts. Thus, if educators want to efficiently assess student learning and better understanding student comprehension, they should focus assessment activities on threshold concepts at an appropriately high level on Bloom's taxonomy.

LIMITATIONS AND FUTURE RESEARCH

Sample size is an important limitation in our study. It was challenging to recruit students to participate in the survey. Recruiting students from class sections beyond those taught by the co-authors was often problematic, partially because our study was not a priority for other faculty. Also, because we needed to survey students who recently completed the strategy course, potential participants were often already stressed with balancing many other, often higher, priorities. However, since students participated voluntarily, we found they often fully completed our open-ended questions, which are particularly important in exploratory studies.

Question structure and interpretation by respondents was another limitation. In spite of pretesting, there were a few questions that did not generate many usable responses. For example, we asked students about which concept they considered most important **and** difficult and why (emphasis added). This question created a situation where some students responses about why the concept was important which was not our focus.

Another important consideration is how students perceive the importance of concepts. Classroom context matters. Students seem to perceive concepts that are directly applied in a course project or assignment as being more important than concepts which are not so applied. For example, if students are asked to conduct an industry analysis, they likely will utilize Porter's 5 Forces which may take on more importance than other concepts that students do not use in the assignment. Thus, faculty decisions about assignments, projects, testing, and allocation of class time impacts student perceptions of what concepts are important. However, there is a flip side to this - if faculty ensure that students apply and use threshold and other core concepts in projects or assignments, students are likely to perceive them as important. In turn, this suggests that faculty limit the inclusion of non-core concepts in applied parts of the course.

There are a number of future research paths that arise from this initial, exploratory study of threshold concepts in strategic management. One obvious follow up to this study is one utilizing a larger, more diverse sample of students. Some of the methodological shortcomings of this study can be addressed with clearer, more focused questions. Another interesting new path would be to conduct an in-class experiment around a potential threshold concept. Faculty teaching multiple sections of the strategic management course could utilize different teaching pedagogy. For example, faculty teaching multiple sections of the strategy class could lecture on innovation in one section and employ an experiential exercise in the other, and see whether there is a difference in student understanding. In addition, students in both these sections could be asked about how well they believe they understand the concept and also about their perception of the difficulty of the concept.

CONCLUSION

In this paper, we review the importance of threshold concepts to student understanding, and consequently, to our teaching. Using an exploratory approach surveying student understanding of strategy concepts, we identify four likely candidates as threshold concepts in strategy, and two non-core threshold-like concepts. We explore how students encounter transformational "Ah Ha!" moments that facilitate understanding of threshold concepts, and then recommend appropriate strategies to teaching and assessing these concepts.

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