

INCREASING KNOWLEDGE BY LEAPS AND BOUNDS: USING EXPERIENTIAL LEARNING TO ADDRESS THRESHOLD CONCEPTS

Gerald (Jerry) Burch
Tarleton State University
gburch@tarleton.edu

Thomas Bradley
Tarleton State University
tbradley@tarleton.edu

Jana Burch
DaVinci Studies
jana@davincistudies.com

ABSTRACT

The discussion of threshold concepts is growing in the management education literature. These concepts create challenges for students and instructors since they act as barriers to learning. The reward for overcoming these obstacles is the opening of new ways of thinking that were never available before the student mastered the threshold concepts. We propose in this article that experiential learning serves as the perfect means for addressing threshold concepts since experiential exercises facilitate active, social, and creative learning that is necessary to move the student through the preliminal, liminal, and postliminal stages of threshold concept mastery.

INTRODUCTION

Threshold Concepts have received considerable attention in recent management education research (see Meyer & Land, 2005) and will be the focus of a special edition of the *Journal of Management Education* in 2014. By their definition, threshold concepts represent those topics that when learned result in the student “seeing things in a new way” (Meyer & Land, 2003, p. 1). They are also potential stumbling blocks for the students since the threshold concept acts as a barrier to further understanding. Until the student masters the threshold concept they are “stuck” and may engage in surface learning instead of deep learning (Davies & Mangan, 2006). However, when the student engages the threshold concept, and makes sense of the new knowledge, they are transformed, never to see the world the same way again.

From a curriculum perspective, these threshold

concepts may act as gate keepers that prevent the student from ever understanding the initial threshold concept and any further information if it is not mastered. An example is the threshold concept of standard deviation, which is a troubling concept for many students. It is possible that the standard deviation is introduced in the second week of a statistics class and is used every week thereafter in that course and further used in other university courses. The student who does not master the threshold concept of the standard deviation begins to surface learn. They may be able to calculate the standard deviation, perhaps even the probability when given a mean and a standard deviation, but they will never be able to use the standard deviation in a conceptual way. The call from management education scholars is to identify these threshold concepts and find ways to address them.

In this paper we propose that one means of addressing threshold concepts is to use experiential learning exercises. We examine the threshold concept stages and recommended learning styles to overcome troublesome knowledge and then connect these ideas to the experiential learning structure proposed by Wolfe and Byrne (1975). We conclude the paper with recommendations for current users of experiential learning and for those that do not currently use them, so that doors may be opened and students may move forward with their education in leaps and bounds.

INTRODUCING THRESHOLD CONCEPTS

The notion of threshold concepts was introduced by Meyer and Land (2003) to explain why some concepts lead to what Perkins (1999) referred to as troublesome knowledge. In an attempt to address constructivism in

education, Perkins (1999) looked at how knowledge makes trouble for learners, and how educators should address those events when troublesome knowledge occurs. In this context, troublesome knowledge is defined as knowledge that appears to be counterintuitive, alien, or incoherent (Perkins, 1999, 2006). Understanding the different types of knowledge helps identify which type of knowledge may become troublesome.

Perkins (1999) stated that the individual always has to construct or reconstruct what things mean. They do this by using five kinds of knowledge that often lead to troubling consequences. These types of knowledge are: inert, ritual, conceptually difficult, foreign knowledge (Perkins, 1999), and tacit knowledge (Perkins, 2006). Inert knowledge is that information that is rarely called upon. An example is passive vocabulary that the individual knows, but rarely uses. Ritual knowledge is often related to procedural steps where the student knows to invert and multiply when dividing by a fraction, but may not know why they invert and multiply. Conceptually difficult knowledge is that knowledge where the person finds that what they are being told does not match what they already know, or what they have observed. Foreign knowledge is somewhat similar to conceptually difficult knowledge since the student does not know or understand the perspective that was used to construct the understanding or knowledge. An example is the understanding of the actions of one ethnic group, when viewed by another ethnic group that does not share similar beliefs, values, or understandings. Until the world is looked at through the foreign perspective, the understanding will never be gained. Meyer and Land (2003) added that tacit knowledge is also a type of troublesome knowledge since it is knowledge that we act upon but are only peripherally aware or entirely unconscious of it (Perkins, 2006). An example that Perkins (2006) used was that of mathematical problem solving techniques that were devised by Polya (1954, 1957) and that most students use without understanding or even knowing about what Polya wrote. We use this knowledge and open ourselves to a limited knowledge of what using them may even mean to us.

Meyer and Land (2003) looked at various forms of troublesome knowledge in teaching economics at a university in the United Kingdom. What they found was that the mastery of some forms of troublesome knowledge resulted in the student seeing the world in a different way. Concepts, by their very nature, serve as the building blocks of knowledge, but threshold concepts lead to “substantial leaps in understanding” (Wright & Gilmore, 2012, p. 615) since they serve as ‘conceptual gateways’ or ‘portals’ (Meyer & Land, 2003) that open the student’s understanding of their world in a very different way, and do so in such a manner that the student may never be able to go back to viewing the world as they did before. Threshold concepts are therefore transformative, integrative, bounded, and hold irreversible characteristics (Meyer & Land, 2003). Examples of threshold concepts are: opportunity costs in economics (Davies & Mangan, 2006), gravity in physics

(Irvine & Carmichael, 2009), and complex numbers and limits in mathematics (Scheja & Pettersson, 2010).

Wright and Gilmore (2012) further investigated threshold concepts in management and argued that the troublesome nature of some threshold concepts comes from the way concepts work together to create an underlying game (Perkins, 2006), instead of from the individual concepts themselves. Land and his colleagues (Land, Cousin, Meyer, & Davies, 2005) referred to these types of threshold concepts as threshold conceptions since they bind together aspects of a concept and how that concept may be viewed by those practicing in a specific discipline.

HOW TO ADDRESS THRESHOLD CONCEPTS

After acknowledging that threshold concepts exist it is imperative to discuss how to introduce students to these concepts. Perkins (2006) argues that students will not learn unless they rediscover Greek philosophy or Newton’s laws for themselves. Threshold concepts therefore require a level of struggle that the student must undertake to master. The student often needs to wrestle with opening the door to appreciate what is on the other side.

Phillips (1995) stated that there are three distinct roles in learning through constructivist processes that may be helpful to mastering troublesome knowledge. Active learning requires actively gaining knowledge and learning, social learning where knowledge is socially constructed, and creative learning where knowledge and understanding is created or recreated. These roles have the potential to address threshold concept learning since they allow the educator to challenge the student and move the student across the “transformational landscape” (Meyers & Land, 2005, p. 279) of threshold concepts and threshold conceptions. Students will naturally become “stuck” and be forced to actively create or recreate their perceptions of reality, either by themselves or socially, in a manner that will change their view of the world. This is a stark contrast to those students that adopt a surface learner approach to the concept and meet the course requirements through rote learning, mimicry, or other passive means that result in no transformation in thought (Ramsden, 2003).

A major challenge for educators is how to construct the specific exercises that provide the student with the proper scenario that allow for the uncovering of knowledge. Meyer and Land (2003) stated that there are three distinct steps required to ensure the student moves through the conceptual portal. The first is the *preliminal* (from Latin *limen* – threshold) stage where the student has not crossed the threshold, the *liminal* stage where the student is at the threshold, and the *postliminal* stage where the student has a new understanding based on moving through the threshold. Educators must first develop ways to “listen for understanding” to determine where the student is (Land et al., 2005) on the *liminality* scale, perhaps by developing activities to expose the student’s understanding of the threshold concept (Davies & Mangan, 2006). Wright

and Gilmore (2012) developed a process of identifying preliminal students and then coaxing them to become confused and frustrated. At this point the student begins to reconstruct their ideas based on the new levels of knowledge either alone or socially. The student is holding on to their old way of thinking, while moving to their new way of thinking. This is like a child on the monkey-bars, where one hand reaches for the new knowledge while holding on to the past in the *preliminal stage*, briefly holds on to both bars in the *liminal stage*, and then releases with the first hand to move forward in the *postliminal stage*, thereby mastering the threshold concept with an active learning that is led by the instructor.

This discussion of threshold concepts illustrates a perfect scenario for which to use experiential learning. In the next section we will briefly outline the definition of experiential learning and develop a framework to connect threshold concepts to experiential learning.

USING EXPERIENTIAL LEARNING TO ADDRESS THRESHOLD CONCEPTS

“Experiential learning exists when a personally responsible, participant cognitively, affectively, and behaviorally processes knowledge, skills, and/or attitudes in a learning situation characterized by a high level of active involvement” (Hoover & Whitehead, 1975, p. 25). In essence, the “student can learn from experience” (Gentry, 1990, p. 9). Embedded in this definition are many concepts, however the one of most import to this discussion is that of learning being the result of active involvement with the subject. Again, the mental image is of the student actively wrestling with the concepts until new knowledge is developed and integrated in a way that the student can use that knowledge.

One task structure outlined by Wolfe and Byrne (1975) stated that experientially-based exercises should involve four phases: design, conduct, evaluation, and feedback. In the design phase the instructor determines the learning objective, selects the activity, identifies the factors affecting student learning, and lays the theoretical base so that the participant views the activity through the desired lens (Gentry, 1990). In the conduct phase the instructor maintains and controls the learning by altering the design as necessary to ensure the experience is structured and arrives at the desired outcome. During the evaluation phase the instructor allows the student to evaluate their experience. And finally, in the feedback phase the participant receives reinforcing information to help guide their learning. One note about the feedback phase is that it should be present throughout the entire activity, instead of saved as a last minute parting comment from the instructor.

This task structure outlines the required dimensions needed to address threshold concept stages and learning. Figure 1 shows the relationships across these three dimensions. We will first address how experiential learning

can be used to move the student through the threshold concept learning stages and then we will propose a means of using the experiential learning structure to create active, social, and creative learning.

USING EXPERIENTIAL LEARNING TO NAVIGATE THRESHOLD CONCEPT STAGES

Threshold concepts by their nature are difficult for students to conquer since they are counter-intuitive, alien, or incoherent (Perkins, 1999, 2006) to the student. Instructors that are willing to address threshold concepts with experiential learning exercises provide the structure needed to help the student move from preliminal to liminal, and finally to postliminal.

In the preliminal stage the student holds on to the previous knowledge (Meyer & Land, 2003) and may not be ready to grasp the new knowledge. All four experiential learning phases address the student in this stage. When the instructor chooses to use an experiential learning exercise they should commit to designing a learning experience that moves the student past the preliminal stage. As the instructor conducts the research they set the learning stage and then monitor the student’s level of understanding so they can adjust the process or extend the time to allow the student to make sense of their base knowledge. During the conduct phase the instructor determines if the student is still in the preliminal stage and if they are ready to move forward. The key to this step is the evaluation of the student by the instructor and the feedback that the instructor gives to the student. Again, the focus is on determining if the student understands the base material and to see if they are ready to be advanced into the liminal stage.

As the student passes into the liminal stage they hold on to previous knowledge while they make sense of the new knowledge. Threshold concepts create situations where the student must wrestle with new, conflicting, or other troublesome ideas. Using experiential learning exercises helps instructors facilitate the student’s learning in this phase. The instructor conducts the exercise to expose the new idea and then gives feedback and works with the student to “listen for understanding” (Land et al., 2005). At this point the instructor can provide the feedback needed to challenge the student’s old understanding and new understanding. This forces the student to evaluate their old knowledge. Wright and Gilmore (2012, p. 625) claim that “if the coaxing is done successfully that the preliminal student becomes confused and frustrated.” At this point the student is entering the liminal stage.

As the student continues to struggle they hold on to their previous conceptions and begin to embrace the threshold concept. If the instructor continues to conduct the experiential exercise in a manner that allows the student time to evaluate their knowledge and then gives the student feedback they help the student regard their emerging understanding of the threshold concept and encourage the

student to tolerate the uncertainty (Wright & Gilmore, 2012). This process is not possible using most pedagogies since the instructor is not positioned to alter the time for instruction, does not receive or send rich feedback to the student, and does not encourage the student to evaluate old knowledge and new knowledge. The structure for experiential learning overcomes all of these problems.

This discussion demonstrates how the four experiential learning phases that were developed almost 40 years ago still provide the structure needed for instructors to address the threshold concept problem. However, as threshold concepts continue to grow in importance it is important for us to resist the urge to reinvent pedagogies. The four phase model offered by Wolfe and Byrne (1975) is still applicable today in teaching, and in addressing threshold concepts.

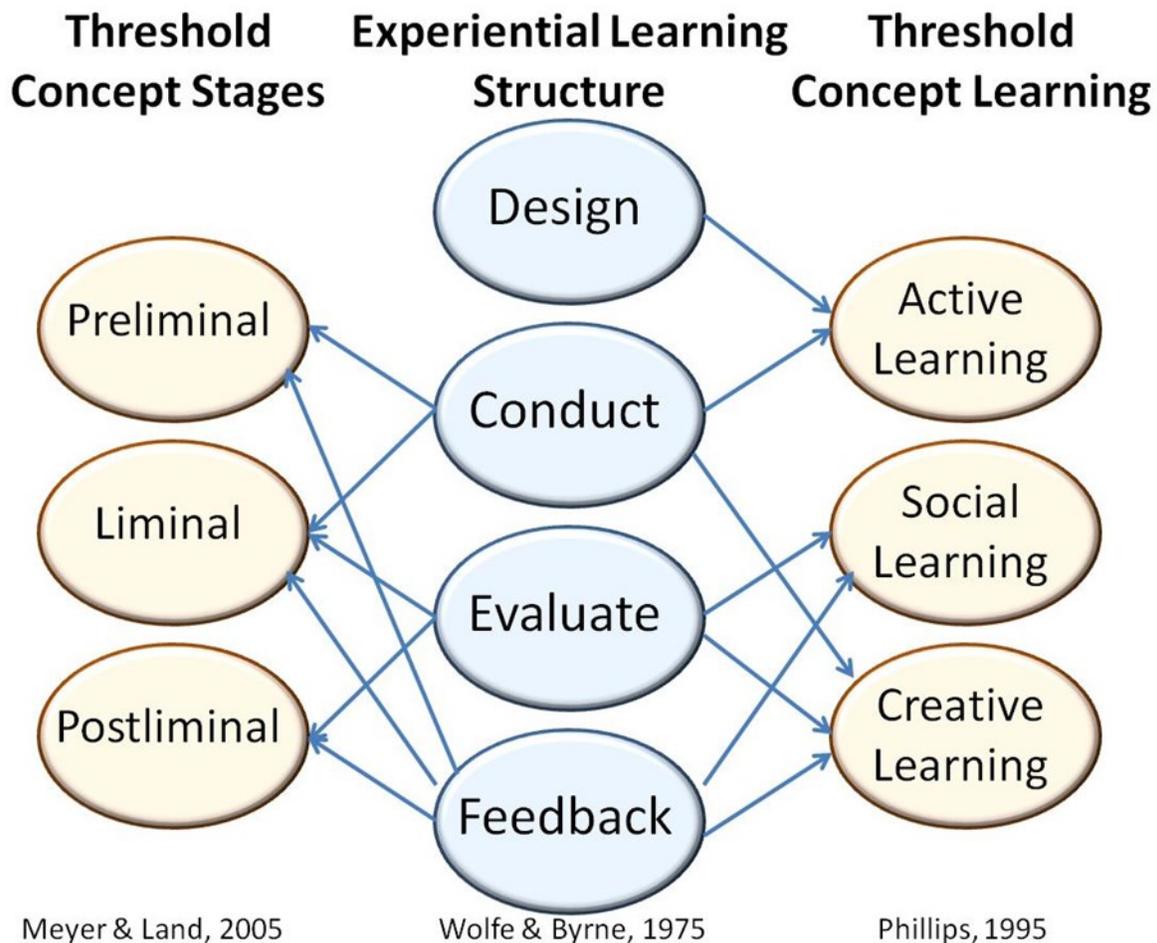
USING EXPERIENTIAL LEARNING TO EMBRACE THRESHOLD CONCEPT LEARNING

Phillips (1995) claims that threshold concepts can be taught using active, social, and creative learning. Figure 1 shows that the experiential learning structure provides the scaffolding needed to allow all three of these learning styles.

Active learning is facilitated through the design and conduct of the experiential learning exercise. The definition of experiential learning states active participation by the student leads to learning. When instructors choose to use experiential learning they commit to using the active learning approach to teaching. This design further supports active learning when the instructor conducts the exercise. This phase allows the instructor to ensure that all students are engaged, cognitively, physically, or emotionally.

Social learning is also enhanced by using experiential learning. The two major social groups associated with

**FIGURE 1
USING EXPERIENTIAL LEARNING STRUCTURE
TO ADDRESS THRESHOLD CONCEPT STAGES AND LEARNING**



experiential learning are the student to student interactions, or the student to instructor communication. Well-designed experiential learning exercises create circumstances when the student must talk with other people. The student hears multiple viewpoints. They begin to talk about their own ideas, and as they talk they create their own ideas. This social interaction allows the student to determine why the new knowledge is both accurate and useful, thereby creating a situation where they can release their old knowledge (Meyer & Land, 2005) and embrace the new knowledge. Few pedagogies allow such interaction between students and instructors, and amongst students.

Creative learning has long been described as both a contribution and challenge with experiential learning. As discussed in the social learning section, the student will create new knowledge for themselves as they interact with the knowledge, with themselves, and with other people. Creative learning is so prevalent in experiential learning that many have warned that the student often learns something that was not foreseen by the instructor (Gentry, Commuri, Burns, & Dickinson, 1998). Threshold concepts offer real learning opportunities for students. However, as the student steps through the door to new knowledge they may create other knowledge by using a focal lens that others have not used before.

As seen by this discussion, the four phases of experiential learning (Wolfe & Byrne, 1975) allows for the active, social, and creative learning that Phillips (1995) says are important for overcoming troublesome knowledge. Instructors looking for means of addressing threshold concepts should look towards experiential learning and the forty years of research that support this learning.

IMPLEMENTATION CHALLENGES

Each student is on a learning journey build around mastery of previous concepts, threshold concepts, and threshold conceptions. The start and end point of this journey will vary for each of these students (Wright & Gilmore, 2012). This places great pressure on educators to identify concepts and teach at the conceptual level that allows students to wrestle with the new knowledge. Similarly, the educator must create situations to deliberately listen to the student to determine moments of where the student has a gross conceptual error. At these moments the educator must have a toolkit of experiential learning exercises that allow the student to actively engage the new knowledge and to create or recreate knowledge either alone or socially in an active manner. In this way the educator allows the student to uncover new knowledge, thereby mastering the threshold concepts and threshold conceptions.

CONCLUSION

The primary purpose of this paper was to show how

experiential learning addresses many of the needs associated with teaching students threshold concepts. The four phase experiential learning structure (Wolfe & Byrne, 1975) provides the necessary structure that allows the instructor to lead the student through the preliminal, liminal, and postliminal stages associated with threshold concepts (Meyer & Land, 2005). No other structure is currently discussed in the threshold concept literature and should be recognized by other scholars to ensure that we do not reinvent the wheel that was constructed decades ago. Similarly, the four phase structure is unique in that it allows instructors to engage the student through active, social, and creative learning. Instructors who can use these ideas will undoubtedly help their students master threshold concepts.

A secondary purpose that has developed during this research is the acknowledgement from those instructors that are currently using experiential learning that their craft is both necessary in overcoming troublesome knowledge and to challenge them to investigate their curriculum to identify those threshold concepts in their own teaching. It is almost impossible to teach at the experiential level all the time. Therefore, identifying those threshold concepts is important so that constructivist instructors can prioritize when and where experiential exercises may make the greatest contributions to student learning.

This discussion provides significant support for the new AACSB standards (2013) which call for the heightened use of experiential learning at the university level. There is so much to learn and stumbling blocks must be overcome quickly. Experiential learning may serve as that means of removing barriers, opening doors, and accelerating learning by leaps and bounds.

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