

# **Troublesome Knowledge and Liminality in ELT Threshold Concepts: A Mirror Reflecting How Knowledge is Processed on the Minds of Students**

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## **ABSTRACT**

Troublesome knowledge, being an essential characteristic of threshold concepts, emerges when university students find it too difficult to understand concepts. According to Perkins (2006), the causes of concepts becoming troublesome are when they are perceived ritual, inert, conceptually difficult, alien and/or tacit. As a result, students crossing a threshold concept go through the liminality of four modes of variation, which are preliminal, liminal, postliminal and subliminal (Land & Meyer, 2010; Meyer & Land, 2003, 2006a). Interestingly, investigating troublesome knowledge in tertiary disciplines reveals how students cognitively interact with concepts within the subject matter of a discipline. The aim of this paper, based on a mixed method EdD research study, is to focus on what concepts ELT Omani student teachers perceived as troublesome knowledge, how they processed troublesome knowledge and what types of strategies they used to overcome troublesome knowledge. The findings revealed a huge variety of different concepts that were perceived as troublesome knowledge. They also showed that the strategies of asking others to help, asking my teachers to help and reading more about the concepts were the three top strategies ELT Omani student teachers used.

*Keywords: Threshold Concepts, Troublesome Knowledge, Liminality and Modes of Variation*

Meyer and Land (2003) propose the notion of threshold concepts in which some discipline-related concepts help students make more sense of their learning experiences and go through epistemological and ontological shifts in the way they think and practice. When students develop these concepts, they become able to think, speak, and act professionally. Therefore, a threshold concept is described as:

akin to a portal, opening up a new and previously inaccessible way of thinking about something. It represents a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress.

(Meyer & Land, 2003, p. 1)

As they point out, threshold concepts can be distinguished from basic or core concepts by a number of characteristics that make them distinctive, potent, and hence distinct. Therefore, they suggest a conceptual framework based on some certain characteristics for identifying threshold concepts in a discipline.

A threshold concept, as Meyer and Land (2006b) conceptualise, is transformative because it engages students to experience “a significant shift in the perception of a subject”, “a transformation of personal identity” and “a shift in values, feeling or attitude” (p. 7). It is probably irreversible, meaning that once a threshold concept is understood, it is very “unlikely to be forgotten, or will be unlearned only by considerable effort” (p. 7). Being integrative is another characteristic because a threshold concept connects and adds meaning to other previously unnoticed, interrelated concepts. It is possibly often bounded because “any conceptual space will have terminal frontiers, bordering with thresholds into new conceptual areas” (p. 8). A threshold concept is potentially (though not necessarily) troublesome as students find it too challenging to grasp because the knowledge it reflects can be ritual, inert, conceptually difficult, alien, or tacit (Perkins, 2006). Therefore, the conceptual framework of threshold concepts entails the following set of characteristics:

1. Transformative
2. Probably irreversible
3. Integrative
4. Possibly often (though not necessarily always) bounded
5. Potentially (though not necessarily) troublesome

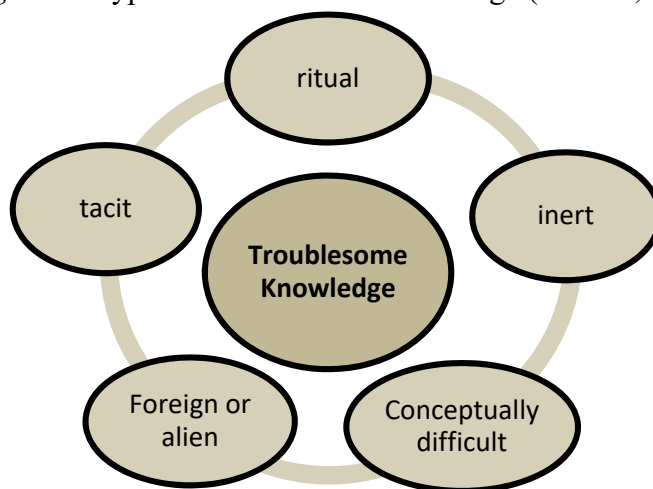
It is important to highlight that threshold concepts go beyond simple cognitive comprehension to a higher level of epistemological and ontological understanding of knowledge, both of which result in new ways of thinking and understanding (Davies, 2006). As the literature of threshold concepts has further developed, the characteristic of being transformative is seen as the most important one due to the fact that it helps students experience a new meaning of learning (Land et al., 2016; Quinnell & Thompson, 2010). Along with transformative shift, troublesome knowledge is also “a defining feature of threshold concepts” (Felten, 2016, p. 4). It can be concluded that the most decisive characteristics of a threshold concept are transformative and troublesome, without which a concept cannot be identified as a threshold concept.

#### *The nature of troublesome knowledge*

Students at tertiary education are exposed to a wide range of terms, concepts and skills that collectively form the basis of expertise in a given subject, yet it is not an easy task to achieve such mastery of knowledge (O'Brien, 2008). The majority of students are highly likely to struggle with

grasping some concepts due to the fact that knowledge cannot be understood in a linear way. Rather, it requires a conceptually cognitive struggle before mastering knowledge. Perkins (2006) refers to this kind of knowledge that triggers a conceptual struggle as troublesome knowledge, because of which students find it too difficult and too challenging to meaningfully have a full grasp of concepts. According to Perkins, troublesome knowledge can be defined as the type of knowledge that is counter-intuitive, alien or incoherent. In other words, it is emerged as the result of being ritual, inert, conceptually difficult, foreign or alien and/or tacit (see Figure 1).

Figure 1. Types of troublesome knowledge (Perkins, 2006)



According to Perkins (2006), ritual knowledge is the type of knowledge that has been ingrained into our minds without much conscious thought of it. When questioned about it, we struggle to explain it as it has become subconsciously part of our hidden system of knowledge. A good example of ritual knowledge in ELT is when students try to explain how to write an essay; a practice they have been doing for many years and has become ritualised in their academic study.

As for inert knowledge, Perkins refers it to the knowledge that we passively store in our brains without being used to form connections with the outside world. We only retrieve it when we are tested or asked. Because it has only one limited purpose, we tend to save it and retrieve it as discrete pieces of knowledge. This type of troublesome knowledge is common among students as they utilize it only to prepare for exams to score high marks, but are unable to apply it for more meaningful contexts in thought-proving discussions and problem-solving situations as in real life. One example of inert knowledge is when students fail or find it too difficult to notice the relationships between some grammatical rules such as the rule of present perfect connecting the past and present events.

Regarding being conceptually difficult, Perkins argues that this type of troublesome knowledge emerges when the knowledge we receive is unfamiliarly against our everyday practices and experiences as well as firmly established beliefs. In other words, some certain knowledge can challenge the beliefs we have developed over the years. A good example is the solar eclipse as some people still hold the belief that the earth is the centre of the universe and that the sun revolves

around it. They find it conceptually too challenging to comprehend the scientific explanation of a solar eclipse as it is against their belief system. Within the context of ELT, many Arab students find it difficult to comprehend the list of past participles as Arabic does not have the rule of present perfect tense.

As for foreign or alien knowledge, it becomes troublesome, as pointed by Perkins, due to the fact that it is unfamiliar to us because it is culturally, politically and socially different. We can easily understand the definition of such knowledge; however, it becomes too conceptually challenging to get a full grasp of its socio-political meaning. A good example would be the term 'democracy' in a country ruled by the military. Within an ELT context, a good example is the concept of inductive learning to university students who were only exposed to deductive learning at high school.

Finally, the type of tacit knowledge, as Perkins point out, is constantly generated and reformed subconsciously until it becomes problematic. In other words, it eventually becomes too challenging to express or understand its theoretical underpinnings. In fact, it becomes like the tip of the iceberg where the hidden part of it remains hidden from our perceptions. A good illustration of this would be college professors instructing young students in mathematics. As for ELT students, an excellent example can be students discussing grammatical errors; they can identify some errors but find it difficult to explain the reasons why they are incorrect.

As a result of facing these five types of troublesome knowledge during their study, a lot of learners typically find themselves 'stuck' in a conceptual space known as liminal state or liminality (Meyer & Land, 2003). The following section discusses the concept of liminality and how threshold concepts are fully grasped.

#### *The concept of liminality, or liminal state*

Meyer et al. (2010) define liminality as "a suspended state of partial understanding, or 'stuck place' in which understanding approximates to a kind of 'mimicry' or lack of authenticity" (p. x). Arguably, it is not simple to acquire knowledge that is troublesome; therefore, many students usually get cognitively 'stuck' in a conceptual space before becoming able to get a full grasp of a concept and eventually cross the conceptual domain of a threshold concept. This conceptual space known as liminal state is basically caused by troublesome knowledge, where learners are conceptually challenged by knowledge before they can construct meaning. While some students become able to understand after exerting a lot of work, others require more time and effort to get through those challenging concepts and eventually cross the liminal state.

Acknowledging the importance of liminal state and troublesome knowledge, it is argued that obtaining knowledge without facing challenge or experiencing conceptual difficulty does not help students appreciate the value of interacting with and grasping knowledge (Meyer & Land, 2006b). In addition, Cousin (2008) stresses the importance of learner anxiety in the process of encountering troublesome knowledge and crossing a threshold concept. She argues that mastering a threshold concept requires a sense of feeling unsafe and challenged during the study. Therefore, when they get stuck in the liminal state, learners feel unsafe and anxious due to the fact that getting stuck in

the liminal state is quite an uncomfortable and stressful experience (Cousin, 2008; Meyer & Land, 2006b; Meyer et al., 2010). As they will have to exert more work and effort, it can be argued then that liminality is the place where students experience “an uncomfortable shift in identity” and “a sense of loss” (Meyer et al., 2010, p. x) and eventually experience a sense of transformational learning (Land & Meyer, 2010).

It is true that the process of interacting with troublesome knowledge in the liminal state for acquiring transformative learning can cause an unsettling experience, especially when students get stuck in the liminal state more than expected. That is why it is important for them to use a variety of strategies such as self-management strategy, to monitor their progress as troublesome knowledge poses a threat to knowledge construction (Perkins, 2006). It is also important for learners to see through the troublesome knowledge lens in order to identify the challenges they are experiencing (Gonzalez & Ozuna, 2021). When learners continuously keep attempting to overcome troublesome knowledge, it can be seen as a way of preparing oneself for transformational learning (Savin-Baden, 2008). Furthermore, utilizing a variety of learning strategies in order to overcome troublesome knowledge can be seen rewarding as students might develop a level of autonomy and become autonomous learners who can later be able to overcome troublesome knowledge and cross the liminal state in their journey to experiencing ontological change (Cousin, 2008; Orsini-Jones, 2010). Not only is ontological shift experienced, but also knowledge can be manipulated and created when a threshold concept is crossed (Kiley & Wisker, 2010). Such epistemological awareness indicates “a shift, a change, in the learner’s appreciation and understanding of her/himself as well as what has been learned” (Kiley & Wisker, 2010, p. 412).

In addition to being difficult for students to acquire, threshold concepts are also too challenging to teach (O'Brien, 2008). They can be challenging for teachers to teach since they are characterized by troublesome knowledge that makes them too challenging to teach and learn. If instructors are unaware of the types of troublesome knowledge, it will be more challenging for them to support and guide students towards understanding those concepts, especially when they get stuck in the liminal state. Therefore, teachers need to be aware of how the modes of variation operate in liminality so that they can support their students and prevent them from being stuck in liminal spaces when they encounter troublesome knowledge. The modes of variation are discussed in the following section.

#### *Modes of variation in liminality*

Land and Meyer (2010, p. 64) define variation as “the extent or degree to which individuals vary in performance and understanding”. They point out that liminality is comprised of a set of liminal modes of variation, or conceptual spaces, where learners go through before overcoming troublesome knowledge and crossing a threshold concept. They clarify that the modes of variation may discretely and sequentially take place within four conceptually different phases, which are preliminal, liminal, postliminal and subliminal. Through these modes in liminality, students go

through, experience, interact with and overcome troublesome knowledge before mastering the conceptual domain of a threshold concept (see Table 1).

*Table 1. Modes of variation (Land & Meyer, 2010)*

Modes of Variation	Processes involved
1. Preliminal	How learners perceive potential threshold concepts
2. Liminal	How learners enter or get stuck in the space
3. Postliminal	How learners exit the liminal space
4. Subliminal	How learners become aware of knowing

According to Land and Meyer (2010), the preliminal mode of variation is where learners come into contact with and perceive a potential threshold concept. It is followed by the liminal mode where learners' initial interaction with a new threshold concept is perceived troublesome; and thus, it requires more meaning negotiation and construction in order to make sense of knowledge. This liminal space is obviously the most crucial one due to the fact that many learners are quite prone to 'get stuck' there as a result of the influence of knowledge transformation. Crossing the liminal space, learners enter the postliminal mode where they start to experience and formulate epistemological and ontological shift in their ways of thinking and practising. As for the fourth phase, the subliminal mode of variation provides learners with the conceptual space where knowledge is ingrained into their perception and belief systems as a result of their interaction and engagement with threshold concepts in the previous modes. In other words, this mode is where learners develop a way of knowing within a conceptual domain. As acquiring troublesome knowledge is fundamentally based on the four modes of variation and can "unlock developmental progressions" (Meyer & Timmermans, 2016, p. 28), we can argue that the subliminal mode of variation can be described as the developmental zone of an initial professional identity.

To sum up, it is clear that troublesome knowledge as a key characteristic of threshold concepts plays an important role in acquiring knowledge. Students going through the modes of variation are subjected to a transformational shift epistemologically and ontologically. Focusing on what makes knowledge troublesome and how it is conceptually interacted and overcome, the framework of troublesome knowledge and liminality works as a mirror reflecting how knowledge is interacted, processed and understood on learners' minds during their study. This awareness will help instructors diagnose the reasons why some concepts are more difficult than others and what teaching and learning strategies are needed to support learners' understanding and mastery of target knowledge.

### **Background to the study and research questions**

The research was conducted in Oman, an Arab country in Southwest Asia, where English is widely used in business and academic institutions. It is one of the main subjects in the educational system, where it is taught from Grade 1 up to Grade 12. Students cannot enrol in the first year of their discipline at most higher education institutions unless they receive an IELTS 5-overall score or complete a three-semester foundation program.

Two Omani co-educational colleges, ASU and CRU (pseudonyms), were selected for the study. They were chosen because they offer a high-quality of accredited BA degrees in ELT teacher education in Oman. Participants were Omani students studying English Language Teaching (ELT), whose ages ranged between 20 and 24 years.

The purpose of this research paper was to answer the three following research questions:

1. What concepts are difficult and cause troublesome knowledge?
2. Why do those concepts cause troublesome knowledge?
3. What strategies do students use to overcome difficulty and understand those concepts?

### Research methodology

The research study adopted a mixed methods approach through the use of a questionnaire and an interview. It was assumed that using mixed methods research could target many participants, which would help generate richer data in order to understand the social phenomenon in a better way (Biesta, 2012; White et al., 2016). In addition, devising a questionnaire with close-ended and open-ended questions for collecting quantitative data aimed to reduce the researcher's influence and bias when analysing and reporting participants' responses, unlike the interpretive analysis of interviews (Biesta, 2012; Cousin, 2009; Silverman, 2001; White et al., 2016). The final reason was to generate more valid findings from using a triangulation of different methods which "enhance the strength and validity of research findings" (Biesta, 2012, p. 147).

### Participants

A total of 212 Y1 and Y4 Omani student teachers at two Omani academic institutions were voluntarily selected to answer questions about the most difficult concepts they encountered in their ELT teacher education programmes (BA degree) and the strategies they used to understand them. As shown in Table 2, the male to female gender ratio of the 110 Y1 participants at both colleges was very close (51% females and 49% males). In contrast, the number of Y4 participants (n=102) was dominated by female students with 70%. College-wise, there were more female participants than male participants in each study group with the exception of Y1 at CRU, where male students made up 69% of the 59 participants. At ASU, female students represented 75% of the participants at both Y1 and Y4. Conversely, the female students only comprised 31% of the participants in Y1 at CRU, whereas they were the majority in Y4 at CRU, representing 63% of the participants. Overall, a total of 85 male and 127 female student teachers volunteered to take part in the study. This indicates that the voices of male and female student teachers were represented fairly.

Table 2. Y1 and Y4 participants at ASU and CRU

		Year 1			Year 4+		
		Gender			Gender		
		Male	Female	Total	Male	Female	Total
Institutions of Higher Education	ASU	13 (25%)	38 (75%)	51	13 (25%)	40 (75%)	53
	CRU	41 (69%)	18 (31%)	59	18 (37%)	31 (63%)	49
	Total	54 (49%)	56 (51%)	110	31 (30%)	71 (70%)	102

In brief, the interview sessions were carried out with 20 Y4 student teachers; 10 from ASU and 10 from CRU as shown in Table 3. The purpose was to thematically have a further investigation into identifying potential threshold concepts that were generated from the quantitative data obtained from the questionnaire phase (interview analysis is not reported in this research paper).

Table 3. Y4 Interviewees at ASU and CRU

	Y4	Y4	Total
	Male	Female	-
ASU	5 (50%)	5 (50%)	10
CRU	6 (60%)	4 (40%)	10
Total	11 (55%)	9 (45%)	20

#### *Study design and data collection procedure*

Taking into account how important it is to design a practical and effective “sequence of data collection” (Gorard, 2013, p. 3), a modified sequential explanatory mixed methods design was adopted where the questionnaire was the first phase followed by the interview sessions. For the questionnaire data, a compare and contrast analysis was used in which the troublesome concepts reported by Y1 participants were compared with the ones mentioned by Y4 participants in order to find out any significant pattern in their responses. As for the data obtained from the interview sessions, a thematic analysis was implemented to further investigate the effects of troublesome knowledge that were generated from the questionnaire phase. It is worth noting that the findings of the interviews are not reported as the purpose of this research paper is to focus on the quantitative data. Therefore, the analytical framework of this research paper was statistically based on the types of troublesome knowledge and the strategies obtained from the questionnaire.

### **Research findings**

#### *Troublesome knowledge and strategies used by ASU Y1 participants*

A total of 51 ASU Y1 participants volunteered to report the three most difficult educational concepts they encountered in their study with the strategies used to overcome them. Table 4 shows that the total number of their responses was 97 out of 153 possible answers where *grammar*, *writing and vocabulary* received the highest responses as troublesome knowledge and they represented 13.4%, 6.2% and 4.1% of the total responses respectively. In contrast, there were 56 cases of no attempt, which represents 36.6% of the total possible answers. The findings show a wide range of educational concepts that were reported as troublesome in ASU Y1 context.

Table 4. Most troublesome educational concepts reported by ASU Y1 participants

	Responses		Participants %	
	N	%		
Most troublesome concepts (ASU Y1)	Grammar	13	13.4%	25.5%
	Academic Writing	6	6.2%	11.8%
	Vocabulary	4	4.1%	7.8%
	Critical Thinking	3	3.1%	5.9%
	Educational Research	3	3.1%	5.9%
	Linguistics	3	3.1%	5.9%
	Progressive (tense)	3	3.1%	5.9%
	Academic Reading	2	2.1%	3.9%
	Argumentative Essay	2	2.1%	3.9%
	Clauses	2	2.1%	3.9%
	Math	2	2.1%	3.9%
	Paraphrasing	2	2.1%	3.9%
	Philosophy	2	2.1%	3.9%
	Philosophy of Education	2	2.1%	3.9%
	Translation	2	2.1%	3.9%
	Others	46	47.4%	-
	Total responses	97	63.4%	-
No attempt	56	36.6%	-	

As for the three strategies they used to overcome and understand difficult concepts, Table 5 shows that ASU Y1 participants managed to provide 111 responses out of the 153 possible answers. In 1st place came the strategy of *Ask others to help*, representing 18% of the total responses. It was followed closely by the strategies of *Read more about the concepts* (16.2%), *Do more practice to understand* (14.4%) and *Ask my teachers to clarify* (13.5%). Out of the 153 possible answers, ASU Y1 recorded a total of 111 responses, which represent 72.5%. In contrast, there were 42 cases of no attempt, indicating 27.5% of the total possible answers.

Table 5. Strategies used to overcome troublesome knowledge reported by ASU Y1 participants

	Frequency	Percent	
Most Strategies (ASU Y1)	Ask others to help	20	18%
	Read more about the concepts	18	16.2%
	Do more practice to understand	16	14.4%
	Ask my teachers to clarify	15	13.5%
	Watch educational videos	10	9%
	Search the internet for the concepts	6	5.4%
	Study hard to understand	5	4.5%
	Memorise the concepts	3	2.7%
	Translate the concepts into Arabic	3	2.7%
	Others	15	13.5%
	Total responses	111	72.5%
No attempt	42	27.5%	

*Troublesome knowledge and strategies used by ASU Y4 participants*

A group of 53 ASU Y4 participants volunteered to record the three most difficult educational concepts they encountered in their teacher education programme with the top three strategies used to overcome those concepts. Table 6 shows that they managed to provide 129 responses out of the 159 possible answers. As can be seen, *pedagogy* was reported as the most difficult concept as it received 7 responses, which represent 5.4% of the total responses. It was followed by the concept of *measurement* in 2<sup>nd</sup> place and *syllabus design* in 3<sup>rd</sup> place with 4.6% and 3.9% of the total responses respectively. Unlike the cases of no attempt on troublesome knowledge recorded by ASU Y1 (n=56, 36.6%), ASU Y4 participants recorded fewer no attempt cases (n=30, 18.9%). Overall, the findings reveal a wide range of educational concepts which were expressed as troublesome.

*Table 6. Most troublesome educational concepts reported by ASU Y4 students*

	Responses		Participants %
	N	%	
Pedagogy	7	5.4%	13.2%
Measurement	6	4.6%	11.3%
Syllabus Design	5	3.9%	9.4%
Philosophy of Education	4	3.1%	7.5%
Teaching Methods	4	3.1%	7.5%
Approach	3	2.3%	5.7%
Audio-lingual Method	3	2.3%	5.7%
Classroom Management	3	2.3%	5.7%
Desuggestopedia	3	2.3%	5.7%
Validity	3	2.3%	5.7%
Others	88	68.2%	-
Total responses	129	81.1%	-
No attempt	30	18.9%	-
All possible answers	159	100%	-

As for the top three strategies they used to overcome and understand difficult concepts, Table 7 shows that participants provided 142 responses out of the 159 possible answers. The strategy of *Read more about the concepts* was the most used strategy as it was reported 25 times, representing 17.6% of the total responses. It was followed closely by the strategies of *Ask my teachers to clarify* (22 responses = 15.5%) in 2<sup>nd</sup> place. The strategies of *Watch educational videos* (16 responses = 11.3%) and *Ask others to help* (15 responses = 10.6%) were very close in 3<sup>rd</sup> and 4<sup>th</sup> places. In comparison with the cases of no attempt reported by ASU Y1 participants (n=42, 27.5%), ASU Y4 participants reported fewer cases of no attempt (n=17, 10.7%).

Table 7. Strategies used to overcome troublesome knowledge reported by ASU Y4 participants

		Frequency	Percent
Most strategies used (ASU Y4)	Read more about the concepts	25	17.6%
	Ask my teachers to clarify	22	15.5%
	Watch educational videos	16	11.3%
	Ask others to help	15	10.6%
	Search the internet for the concepts	13	9.1%
	Relate the concepts to real life	5	3.5%
	Study examples	5	3.5%
	Translate the concepts into Arabic	5	3.5%
	Use a dictionary	5	3.5%
	Memorise the concepts	4	2.8%
	Others	27	19%
	Total responses	142	89.3%
	No attempt	17	10.7%

#### *Troublesome Knowledge and Strategies Used by CRU Y1 Participants*

A total of 59 CRU Y1 participants volunteered to report the three most difficult educational concepts they experienced in their ELT courses. Table 8 reveals that they recorded 124 responses out of the 177 possible answers. A total of 18 participants experienced the concept of *phonetics* as the most troublesome concept, indicating 14.5% of the total responses. In 2<sup>nd</sup> and 3<sup>rd</sup> places came the concepts of *English literature* and *academic reading* which were reported by 11 and 9 participants respectively. In contrast, there were 53 of no attempt cases, which represents 29.9% of the total possible answers. Overall, CRU Y1 participants recorded a wide range of troublesome knowledge.

Table 8. Most troublesome educational concepts reported by CRU Y1 participants

		Responses		Participants %
		N	%	
Most troublesome concepts (CRU Y1)	Phonetics	18	14.5%	30.5%
	English Literature	11	8.9%	18.6%
	Academic Reading	9	7.2%	15.2%
	Academic Writing	8	6.4%	13.5%
	IT	7	5.6%	11.9%
	Linguistics	7	5.6%	11.9%
	Phonology	5	4%	8.5%
	Pronunciation	5	4%	8.5%
	Academic Listening	4	3.2%	6.8%
	Vocabulary	4	3.2%	6.8%
	Others	46	37.1%	-
	Total responses	124	70.1%	-
	No attempt	53	29.9%	-

Regarding the top three strategies they used to understand troublesome knowledge they encountered, Table 9 reveals that CRU Y1 participants were able to report a number of 155 responses out of the 177 possible answers. In 1<sup>st</sup> place came the strategy of *Ask others to help* with 23 responses, representing 14.8% of the total responses. The strategy of *Ask my teachers to clarify* came in 2<sup>nd</sup> place after receiving 20 responses which represents 12.9% of the total responses. The strategy of *Read more about the concepts* came in 3<sup>rd</sup> place with 15 responses (9.7%). In contrast, CRU Y1 participants reported 22 cases of no attempt, indicating 12.4% of the total possible answers. Overall, there were a wide range of strategies used to overcome troublesome knowledge.

*Table 9. Strategies used to overcome troublesome knowledge reported by CRU Y1 participants*

	Frequency	Percent	
Most strategies Used in CRU Y1	Ask others to help	23	14.8%
	Ask my teachers to clarify	20	12.9%
	Read more about the concepts	15	9.7%
	Search the internet for the concepts	13	8.4%
	Study hard to understand	12	7.7%
	Watch educational videos	12	7.7%
	Do more practice to understand	10	6.4%
	Memorise the concepts	10	6.4%
	Read stories	3	1.9%
	Translate the concepts into Arabic	3	1.9%
	Others	34	21.9%
	Total responses	155	87.6%
	No attempt	22	12.4%

#### *Troublesome knowledge and strategies used by CRU Y4 participants*

A total of 49 CRU Y4 participants volunteered to answer the three most difficult educational concepts they experienced in their study. Table 10 shows that participants managed to report a total of 130 responses out of the 147 possible answers. The concept of *teaching methods* was experienced as the most difficult one after receiving 11 responses, representing 8.5% of the total responses. In 2<sup>nd</sup> place came the concept of *validity* which was recorded by 9 participants, and this indicates 4.6% of the total answers. The concepts of *classroom management*, *communicative ability*, *critical thinking*, and *practicality* came in 3<sup>rd</sup> place after receiving 5 responses. In comparison with CRU Y1 participants' cases of no attempt (n=53, 29.9%), CRU Y4 participants significantly reported fewer no-attempt cases (n=17, 11.6%). Overall, the findings reveal a wide range of concepts perceived as troublesome knowledge.

Table 10. Most troublesome educational concepts reported by CRU Y4 participants

	Responses		Participants	%
	N	%		
Most troublesome concepts (CRU Y4)	Teaching Methods	11	8.5%	22.4%
	Validity	6	4.6%	12.2%
	Classroom Management	5	3.8%	10.2%
	Communicative Ability	5	3.8%	10.2%
	Critical Thinking	5	3.8%	10.2%
	Practicality	5	3.8%	10.2%
	Assessment	4	3.1%	8.2%
	Pragmatics	4	3.1%	8.2%
	Curriculum Evaluation	3	2.3%	6.1%
	Error Analysis	3	2.3%	6.1%
	Procedure	3	2.3%	6.1%
	Rapport with Students	3	2.3%	6.1%
	Reflection	3	2.3%	6.1%
	Syntax	3	2.3%	6.1%
	Others	67	51.5%	-
	Total responses	130	88.4%	-
No attempt	17	11.6%	-	

As for the top three strategies employed to overcome troublesome knowledge, Table 11 reveals that CRU Y4 participants were able to provide a total of 138 responses out of the 147 possible answers. Almost half of the participants (n=23) reported that the strategies of *Ask my teachers to clarify* and *Ask others to help* were the most common strategies used to overcome troublesome knowledge, and this represents 16.7% of the total responses each. The strategy of *Search the internet for the concepts* came closely in 2<sup>nd</sup> place with 21 responses, representing 15.2% of the total responses. In 3<sup>rd</sup> place came the strategy of *Read more about the concepts* (n=17, 12.3%). In comparison with CRU Y1 participants' no attempt cases (n=22, 12.4%), CRU Y4 showed significantly fewer no attempt cases (n=9). Overall, the findings show a wide range of strategies used to overcome troublesome knowledge.

Table 11. Strategies used to overcome troublesome knowledge reported by CRU Y4 participants

	Frequency	Percent	
Most strategies used (CRU Y4)	Ask my teachers to clarify	23	16.7%
	Ask others to help	23	16.7%
	Search the internet for the concepts	21	15.2%
	Read more about the concept	17	12.3%
	Watch educational videos	8	5.8%
	Do more practice to understand	7	5.1%
	Study hard to understand	4	2.9%
	Translate the concepts into Arabic	4	2.9%

Use a dictionary	4	2.9%
Memorise the concepts	3	2.2%
Study examples to understand	3	2.2%
Others	21	15.2%
Total responses	138	93.9%
No attempt	9	6.1%

*Reasons of troublesome knowledge*

The ASU and CRU participants were asked in the questionnaire to explain why they considered the challenging educational concepts they had encountered troublesome. With the focus on the potential threshold concepts identified in the research study (not reported in this research paper), Table 12 provides some explanations for why critical thinking, teaching strategies, classroom management, and assessment were thought to be troublesome using the framework of troublesome knowledge suggested by Perkins (2006).

*Table 12.* Reasons why critical thinking, teaching methods, classroom management, and assessment troublesome

Potential Threshold Concepts	Reasons	Types of Troublesome Knowledge (based on Perkins 2006)
Critical Thinking	It requires deep understanding	Conceptually difficult
	Learning something new	Alien
	*It is too difficult to apply	*Practically difficult (new type)
	I am not used to analyse and think critically	Alien
	The concept is vague	Conceptually difficult
Teaching Methods	It has multiple layers of complexity	Conceptually difficult
	*It is too difficult to apply	*Practically difficult (new type)
	I am confused by the different sub categories	Conceptually difficult
	Too many methods to analyse	Conceptually difficult
	It needs lots of thinking to choose the best methods	Conceptually difficult
Classroom Management	There are many things to think about	Conceptually difficult
	*The practical part is difficult	*Practically difficult (new type)
	Concept sounds strange	Alien
	It is not explained well	Conceptually difficult
	What is the real meaning of it, about students' level or control	Conceptually difficult
Assessment	It is similar to the concept evaluation	Conceptually difficult
	It has different meanings	Conceptually difficult
	It needs experienced teachers to explain	Conceptually difficult
	It contains many concepts	Conceptually difficult

The concept of critical thinking was experienced troublesome because it was mostly alien and conceptually difficult. One of the participants reported: “*I’m not used to analyse and think critically*”, while another wrote: “*It requires deep understanding*”. Moreover, there seems to be another type of troublesome knowledge because of the practical aspect of knowledge when a

student recorded: *“It is too difficult to apply”*. As for teaching methods, the type of conceptually difficult seems to be the prevalent reason. For instance, a student reported: *“It has multiple layers of complexity”*, and another participant recorded: *“I am confused by the different sub categories”*. It was also reported as being difficult to apply when a student wrote: *“It is too difficult to apply”*. The concept of classroom management was reported troublesome because it was perceived alien as one of the students found it *“strange”*. It was also experienced being conceptually difficult as a participant reported: *“What is the real meaning of it: about students’ level or control”*. Similar to critical thinking and teaching methods, it was also found practically difficult when a participant recorded: *“The practical part is difficult”*. As for the concept of assessment, being conceptually difficult was the most common reason. One of the students reported: *“It needs experienced teachers to explain”*.

It is apparent that being conceptually difficult and alien are the most common reasons why knowledge is experienced difficult by ELT Omani student teachers. Furthermore, a new type of troublesome knowledge in the form of being practically difficult was identified. As participants were also asked to record the top three strategies they had used to overcome troublesome knowledge, it would be interesting to find out the most preferred strategies used by ASU and CRU participants.

#### *Strategies used to overcome troublesome knowledge*

As presented in the analysis sections, participants recorded a wide variety of strategies used to overcome troublesome knowledge. However, when focusing on the top five strategies (see Table 13), the majority of students at both ASU and CRU reported that the strategies of *Ask others to help* and *Ask my teachers to help* are the most preferred ones as they were mentioned 80 and 81 times respectively. They were closely followed by the strategy of *Read more about the concepts* which was reported 75 times. Then came the strategies of *Search the internet for the concepts* (n=53) and *Watch educational videos* (n=46) in 4<sup>th</sup> and 5<sup>th</sup> places.

*Table 13. Top strategies used to overcome troublesome knowledge*

	Strategies used	Total Responses of Y1 and Y4 at ASU and CRU
1	Ask others to help	81
2	Ask my teachers to clarify	80
3	Read more about the concepts	75
4	Search the internet for the concepts	53
5	Watch educational videos	46

#### **Discussion of findings**

A wide range of educational concepts were reported as troublesome knowledge by Y1 and Y4 participants in the questionnaire. In Y1 context, troublesome knowledge was mostly language-oriented. For instance, the concepts of grammar, academic writing and vocabulary were reported troublesome knowledge by ASU Y1 participants, while phonetics, English literature, academic

reading, and academic writing were expressed difficult concepts by CRU Y1 respondents. On the other hand, Y4 participants were more focused on the nature of troublesome knowledge and experienced troublesome knowledge with pedagogy-related concepts. For example, pedagogy, measurement, syllabus design, classroom management and teaching methods were perceived as troublesome knowledge by ASU Y4 students. Similarly, teaching methods, validity, classroom management, communicative ability and critical thinking were reported troublesome knowledge by CRU Y4 students. The analytical framework of troublesome knowledge (Perkins, 2006) has really shown us how Y1 and Y4 students interact with knowledge and face troublesome knowledge. Moreover, from the lists of troublesome knowledge generated in Y1 context, it is striking to see that wide range of educational concepts even though many of them might not be important for the subject matter of their discipline. They also reveal that many students at both colleges are unaware of what is and what is not important for their study. They might think that they should understand any difficult concept mentioned by their instructors or in textbooks. It is quite frustrating to see the time and effort exerted by those students who get distracted by concepts which are not essential in their specialization. Therefore, it is effective for students to see themselves through the lens of troublesome knowledge in order to identify the challenges they experience as advocated by Gonzalez and Ozuna (2021). The lack of being aware of the nature of troublesome knowledge and the conceptual effort needed can cause barriers to the mastery of knowledge that can trigger any epistemological and ontological change (Meyer & Land, 2006b).

Regarding the reasons why those concepts were perceived troublesome knowledge, the majority of participants in Y1 and Y4 at both ASU and CRU reported that the concepts were conceptually difficult and foreign/alien, and this addresses the framework of troublesome knowledge proposed by Perkins (2006). In addition, many participants reported a new type of troublesome knowledge (practically difficult), which is not characterised in Perkin's framework. It can be argued that it is sometimes difficult to separate the notional representation of a concept from the practical knowledge of it, especially in a context like ELT where practical knowledge plays a big role. Furthermore, the majority of them experienced troublesome knowledge based on their perception of what troublesome knowledge is. That is why new or unfamiliar concepts are highly likely to cause troublesome knowledge; therefore, students need to put more effort and get themselves familiarised with the context of troublesome knowledge in order to overcome the level of difficulty.

As for strategies used to overcome those concepts perceived as troublesome knowledge, it is interesting to find out that human involvement in the form of the strategies of *Ask others to help* and *Ask my teachers to clarify* is the most dominant strategy with the exception of the strategy of *Read more about the concepts* as reported by ASU and CRU Y1 and Y4 participants. On one hand, this shows a good relationship between students and teachers at both colleges, through which they find it easy to communicate their learning difficulty and concerns to them. On the other hand, this reveals that the majority of students are still dependent on others to support their learning in an educational context where they are supposed to be more independent and more autonomous (Cousin, 2006; Orsini-Jones, 2010). The use of high-thinking strategies, such as self-management,

mind mapping, using concepts in context, and relating concepts to real-world experiences, is essentially needed for students to monitor their progress (Perkins, 2006), but it is highly likely to be prevented by student teachers' reliance on other people. In fact, very few students reported high-thinking strategies such as *Draw spidergrams/diagrams/mind maps* and *Study examples to understand it*. This finding shows that ELT Omani student teachers still need to be equipped with more high-thinking strategies and skills in order to positively interact with troublesome knowledge, go through the liminal modes of variation and have a full grasp of a threshold concept domain.

## Conclusion

This research paper reveals that a conceptual as well as an analytical framework based on Perkin's (2006) troublesome knowledge needs to be implemented in the ELT programmes in Oman in order to narrow down the scope of struggling with difficult concepts that ELT Omani students face and experience. A more focused approach to studying ELT concepts where troublesome knowledge is strategically and systematically organised, presented and interacted with will help students and instructors focus more purposefully on the learning outcomes. In addition, students need to be explicitly taught how to use a variety of high-thinking strategies in order to be able to encounter troublesome knowledge. Instead of depending on others to help, they need to be autonomous learners with the ability of planning, negotiating, guiding and monitoring their learning progress. Equipped with higher-thinking strategies, they will also be able to successfully go through the modes of variation in the conceptual domain of a threshold concept.

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