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# **“What I really sort of struggled with...” The use of audio-diaries to identify threshold concepts and troublesome knowledge in a Year 1 Problem Based Learning programme**

## **Introduction**

Problem Based Learning (PBL) is widely used in medical education. PBL cases are usually designed to integrate with, and contextualise, learning in other parts of the course and to ensure that core disciplinary concepts are covered. Less thought tends to be given to which concepts are transformative and fundamental to the grasp of a subject<sup>1</sup> and which concepts are particularly troublesome for learners. Indeed we lack evidence to inform such decisions.

Threshold concepts, identified by Meyer and Land in 2003, can offer such insights. They are transformative, integrative, irreversible, often troublesome and key to achieving mastery of a subject (1).

Threshold concept theory can provide us with such insights. Identified by Meyer and Land in 2003, threshold concepts are transformative, integrative, irreversible, often troublesome and key to achieving mastery of a subject.<sup>1</sup> In 2014 threshold concepts were identified by the Open University, UK, as one of 10 new pedagogies that could transform educational practice.<sup>2</sup> They have been little discussed within medical education.

## **Methodology**

This paper describes an innovative qualitative research project using solicited audio-diaries, a powerful but underused research tool.

Over 6 months, year 1 medical students recorded, on Smart phones, relevant experiences and critical incidents occurring during PBL sessions. They were asked to reflect on a) “aha” and integrative moments b) struggles, when learning is difficult or troublesome and c) “I’ve got it” “No, I haven’t got it” oscillations. PBL tutors also recorded reflections of sessions on their phone.

Reflections were analysed, using Nvivo software, to identify threshold concepts, areas of troublesome knowledge and factors which facilitated learning around these concepts.

## **Results**

We will summarise the fascinating and often unexpected themes emerging from the audio-diary data, including those concepts identified as most likely to be “threshold” for Year 1 students.

## **Discussion**

We will discuss how understanding which concepts are likely to be ‘threshold’ can help us better design a year 1 undergraduate curriculum, informing how we introduce, order and revisit concepts and which concepts may need more time. We will also explore how the findings could contribute to PBL case design: which concepts might usefully form a focus of each PBL case and how we can facilitate learning around each of these.

## **Conclusion**

The use of audio-diary methodology to explore threshold concepts can provide useful insights into student learning in PBL. The insights from this study, particular around the timing and ordering of scientific and clinical concepts within the curriculum, should be of wider interest to medical educators. The findings can also inform tutor training: by helping them to anticipate and recognise, from students' use of language, where thresholds have been crossed and where learning may be troublesome, tutors can support students more effectively.

## **Take home messages**

Year 1 medical students are introduced to a number of concepts which are transformative but also troublesome to learn.

This study helps educators and teachers recognise which concepts are 'threshold' and how, within a PBL setting, to facilitate student learning around these

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<sup>1</sup> Meyer JHF & Land R. (2003). 'Threshold Concepts and Troublesome Knowledge (1) – Linkages to Ways of Thinking and Practising' In: Improving Student Learning – Ten Years On. C.Rust (Ed), (2003), OCSLD, Oxford.

<sup>2</sup> Sharples M, Adams A, Ferguson R, Gaved M, McAndrew P, Rienties B, Weller M, & Whitelock D. (2014). Innovating Pedagogy 2014: Open University Innovation Report 3. Milton Keynes: The Open University.

can offer benefits over more traditional instructional techniques, including improved clinical performance and retention of knowledge. PBL is

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Problem Based Learning (PBL) cases are usually designed to contextualise learning and ensure that core disciplinary concepts are covered. Less thought tends to be given to which concepts are transformative, fundamental to the grasp of a subject and troublesome for learners. Indeed we lack evidence about this.

Threshold concepts (Meyer and Land, 2003) can offer such insights. They are transformative, integrative, irreversible, often troublesome and key to achieving mastery of a subject.

This paper describes an audio-diary research project. Over 6 months, Year 1 medical students and PBL tutors recorded, on Smart phones, relevant experiences occurring during PBL sessions, including a) “aha” moments b) struggles and c) oscillations in learning. Reflections were analysed, using Nvivo, to identify threshold concepts, troublesome knowledge and factors which facilitated learning.

We will summarise the likely threshold concepts, areas of struggle and the nature of this troublesomeness and discuss the 'enabling factors' that appeared to facilitate learning of these concepts.

The Open University, UK, identified threshold concepts as a new pedagogy that could transform educational practice, yet they have been little explored within medical education.

We will discuss how the findings can inform:

- curriculum development, including the introduction, timing and ordering of these concepts.
- how we can facilitate students to cross these important thresholds in learning.

The use of audio-diary methodology to explore threshold concepts can reduce hindsight bias and the illusion of memory. The findings can help tutors support students more effectively, by anticipating and recognising, from students' use of language, where thresholds have been crossed and where learning is troublesome.

Threshold concept theory offers new insights to teachers and curriculum designers

This study helps educators and teachers recognise which concepts are 'threshold' for Year 1 medical students and how, within a PBL setting, to facilitate learning around these.