When the Penny Drops - Threshold concepts in postgraduate sonographer training and development

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Meyer and Land (2003) present the idea that in most disciplines "there are 'conceptual gateways' or 'portals' that lead to a previously inaccessible, and initially perhaps 'troublesome', way of thinking about something".

These are the 'penny drop' moments that lead to transformative and irreversible learning, the dawning realisation of the interconnection of theories and practice experiences that enable students to make sense of profession-specific expectations.

Threshold concepts can transform the way students think and challenge their self-identity.

Both are key as they move towards autonomy as advanced healthcare practitioners.

Threshold concepts can be characterised as…

Transformative: changing the way students view practice in their subject or discipline

Irreversible: once grasped, it is unlikely that Threshold Concepts can be 'unlearned'

Integrative: allowing connections between isolated ideas

Bounded: they can help define the boundaries of a discipline

Troublesome: threshold concepts may be conceptually challenging to students

Within each discipline there are ideas and skills which "transition the learner from novice to expert and transform their way of looking at the world".

However, these may not be clearly identified within module or programme learning outcomes but may be viewed as implicit.

These '**penny drop**' moments may or may not be recognised by students when they occur.

When the penny fails to drop, students may simply mimic behaviour without understanding.

"On mastering a threshold concept the learner begins to think as a professional in that discipline and not simply as a student of that discipline....." *Flanagan 2008*

Student **sonographers** are supported in clinical practice by work based mentors. We used a mentor workshop to explore our understanding of threshold concepts in ultrasound.

Questions we asked:

- What are the key threshold concepts in ultrasound?

- How can we support students to ensure these '**penny drop**' moments happen?

- At what stage of their learning would we expect these thresholds to be encountered?

- How can we identify students where these concepts have not been understood?

- How do we encourage students to acknowledge they are in a '**stuck place**' ?

We found that…..

- Mentors focused overwhelmingly on threshold **skills** rather than underlying concepts. Discussion of key skills such as image orientation identified significant areas of **assumed** knowledge and understanding.

- When challenged to consider **concepts**, discussion clustered around communication issues (breaking bad news) and personal barriers to patient care (cultural and emotional resilience).

- There was no clear consensus on the **expected timing** of when key concepts should normally be grasped by students and acceptance that this would vary between individuals.

- Mentors felt that they needed more guidance from the University on how learning opportunities could be created.

How will we respond…..

- Seek further input from students and newly qualified sonographers to identify threshold concepts that are **implicit** (but not clearly articulated)

- **Make space** within the curriculum for exploration of threshold concepts

- Encourage more open discussion of '**troublesome**' concepts

- Encourage faculty reflection on **assumed** understanding and '**mimicking**' behaviours

- Work with Mentors to help them identify students who are in a '**stuck place**' ?

- Consider novel ways of enabling students to explore threshold concepts within their own practice.

References:
Barradell, S. and T. Peseta (2017). "Putting threshold concepts to work in health sciences: insights for curriculum design from a qualitative research synthesis." Teaching in Higher Education 22(3): 349-372.
Clouder, L. (2005). "Caring as a 'threshold concept': Transforming students in higher education into health (care) professionals." Teaching in Higher Education 10(4): 505-517.
Levett-Jones, T., L. Bowen, et al. (2015). "Enhancing nursing students' understanding of threshold concepts through the use of digital stories and a virtual community called 'Wiimali'." Nurse Education in Practice 15(2): 91-96.
Ma, C., N. Tabarsi, et al. (2017). "Clinical Reasoning and Threshold Concepts." Academic Medicine 92(4): 426-426.
Meyer, J. H. F. and R. Land (2005). "Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning." Higher Education 49(3): 373-388.
Flanagan M. (2008) Threshold Concepts: Undergraduate Teaching, Postgraduate Training, Professional Development and School Education

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