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Learning Clinical Anatomy

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SUMMARY

This article places the students at the center of their own learning experience. It draws together research to enable us to put forward a theoretical framework of best practice for student learning of clinical anatomy in a modern medical curriculum. Anatomical knowledge involves both propositional knowledge and non-technical knowledge. For knowledge to be gained it must be contextualized and the content matter engaged with in a way that creates meaning for the students. From a neuroanatomical basis, this involves memory processing at a synaptic level within the circuitry of the hippocampus. It is important to recognize learners as individuals with their own personality traits and spatial ability. Both of which have been shown to influence the learning of anatomy. Students can vary the way they go about learning: they may utilize a surface, deep and/or strategic learning approach. It is quite possible that each student's approach will differ depending on their personal experience. The approach will also vary at different points of their learning journey, because in higher education students are free to engage in a wide range of learning activities. At some point in the future students may need to relearn or reconfigure their knowledge, because the initial route to understanding is superseded by either a greater need or a more sophisticated line of reasoning: for example, knowledge can be challenged via more complex clinical scenarios. Knowledge consolidation is the next stage for students/trainees and this involves embedding the restructured learning and using it in practice. This stage will vary in time depending on the content: it may occur during education or many years later. Anatomy learning is a personalized journey for the individuals. However, it is the role of the educators to aid learners in the development of an education framework that makes their learning effective, meaningful and stimulating.

Key words: Learning anatomy – Spatial ability – Approaches to learning – Anatomy education – Reflective practice – Assessment

INTRODUCTION

Anatomy education has undergone substantial changes in recent times and these have been well documented (Heylings, 2002; Patel and Moxham, 2006; Drake et al., 2009; Craig et al., 2010; Sugand et al., 2010; Johnson et al., 2012; Drake et al., 2013; Smith et al., 2014; Stabile 2015). Despite the changes, a fundamental principle remains, which is to develop students' understanding of anatomy to facilitate clinical competence. It can be very difficult to bring together all the knowledge and theory underpinning anatomy education. This article aims to focus on the individual aspects influencing student learning, and in doing so will inform us as educators on how the students' learning journey develops and what we need to consider to ensure success. This article focuses on laboratory-based learning experience, whether that is dissection- or prosection-based, because this is where most evidence lies (Stabile, 2015). However, for a variety of reasons (Drake and Pawlina, 2014) many students learn anatomy without access to human cadavers. The principles covered in this article still apply to these students.

It has been stated that 'teaching is a multidimensional, complex activity' (Khandelwal, 2009), the teaching perspective is important but this article is based on the students' rather than the educators' journey. All perspectives on teaching and learning

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anatomy are grounded within the existing literature but also rely on collegial knowledge. In taking this approach, the aim of this article is to unravel aspects of anatomy pedagogy that will resonate with anatomy educators thus presenting in the development of an educational framework for anatomy learning.

ANATOMICAL KNOWLEDGE

Anatomy knowledge can be divided into two components: propositional knowledge and non-technical knowledge. Propositional knowledge is knowing (Klein, 1971), for example, that the mastoid process is the mastoid process and that the sternocleidomastoid muscle attaches to it. Non-technical knowledge (skills) involves professionalism, teamwork, communication and many other skills, often considered to be transferable. In surgical training, increasing emphasis is being placed on these skills (Heidenreich et al., 2016). It is readily acknowledged that the way in which we communicate and learn has changed significantly over the past ten years (DiLullo et al., 2011), especially with the escalation of online/e-learning material. Today's students are known as generation Y or millennial students (DiLullo et al., 2011; Barry et al., 2016): they are seldom offline, multitask frequently and have grown up during the peak of the mobile learning revolution. Medical knowledge has also expanded hugely with 1.8 zeta bytes of new clinical data per year (Fratt, 2012). Whilst clinical data is not knowledge in itself, it has the potential to inform clinical practice if set in the right educational context. The challenge for today's anatomy educators is how to blend together traditional and contemporary approaches that integrate the development of propositional and non-technical knowledge as defined by core syllabi (Smith et al., 2016) for deeper understanding, to best meet student's needs and ultimately the needs of patients.

Knowledge is not gained merely by studying texts or cadavers. Anatomy is a subject that, unlike many others, the students' own body is also their learning resource. For anatomical study to be successful, links to future clinical practice need to be forged early in the students' learning experience (Smith and Mathias, 2010). Students need to be able to contextualize the gross anatomy alongside living and clinical anatomy. To facilitate the development of such knowledge, many institutions employ non-cadaveric approaches to learning anatomy which complement the dissection room experience. These approaches include virtual reality, such as autopsy tables and virtual dissection packages, radiographic imaging and art-based approaches such as body painting and clay modelling (Finn, 2015).

Art-based approaches to anatomical study, such as body painting, prove particularly useful as a method for introducing surface anatomy into medical teaching. Body painting complements the teaching of clinical skills, such as palpation of bony landmarks (Op Den Akker et al., 2002; McMenamin, 2008; Finn and McLachlan, 2010). Within the context of how students learn, art-based approaches enable students to utilise a range of learning strategies (Finn and McLachlan, 2010; Finn et al., 2011; Finn, 2010; Finn, 2015). When 'learning by doing', whether it be body painting, clay modelling or drawing, students utilise visual, auditory and kinaesthetic approaches to learning which are highly engaging and memorable. Colour helps promote retention of knowledge and deeper learning occurs. Students develop a good understanding of dimensions and positions of anatomical structures using art-based approaches whilst studying, particularly when mapping onto living bodies or manipulating clay. Due to the enjoyable nature of these alternative approaches to learning, they become a valuable tool for diminishing the apprehension often exhibited by students within dissection rooms or within clinical skills when conducting peer physical examinations. The use of alternative teaching methods, such as body painting, may therefore be beneficial to students who struggle with cadaveric work (McMenamin, 2008; Finn and McLachlan, 2010; Finn et al., 2011).

This article includes all components of the learning environment, the physical, environmental, social/interpersonal, intrapersonal and technological (Fisher and Abbasi, 2010; Cleveland and Kvan, 2015).

CREATING MEANING

Students have a wealth of life experiences before they reach higher education, making them distinctively unique individuals that will all display a range of characteristics in their learning behavior. In the case of medicine and allied health professions, students are learning with a goal: to deliver safe, high quality care to a patient. There is a 'client' at the end of their learning. Their learning will have an impact on another human being. This is a very powerful extrinsic motivator for learning. Over several years of continued education sight of this goal can become lost, so for students and educators it is important that multiple contexts and motives for learning are established. There is some evidence that particular psychometric traits have an impact on how meaning is created. In anatomy, two of the main ones are believed to be, personality and spatial ability (Fernandez et al., 2011; Langlois et al., 2014; Finn et al., 2015; O'Mahony et al., 2016).

Personality is commonly described as having multiple facets. The Big Five being: Neuroticism, Extraversion, Openness, Agreeableness and Contentiousness (John and Srivastava, 1999). Studies involving medical students have demonstrated that there are positive correlations between conscientiousness and professionalism (Finn et al., 2009) and between contentiousness (especially achievement striving) and assessment (Finn et al., 2015). Students with high conscientiousness and professionalism scores would be actively seeking to create meaning which in turn may explain the positive correlation to assessment outcome. Negative correlations have been found between high levels of gregariousness and assessment (Leivens et al., 2002), and anxiety and performance (Plaisant et al., 2011). Gregariousness and excitement-seeking have been shown to be related to a lack of performance (Lievens et al., 2002): this may reflect that the students have become distracted from their goal and the meaning of their learning. When applying an understanding of personality to student learning they are perhaps more aligned to non-technical knowledge and to how students interact with each other, the program and the faculty.

The human body is a three-dimensional structure, and understanding spatial relationships between individual components that comprise it serve as the foundation on which to build more detailed knowledge. For example, understanding that an aneurysm of the posterior cerebral artery can cause oculomotor nerve palsy is evidence of the orientation of anatomy in space. Spatial ability, or aptitude, is the capacity to think about objects in three dimensions, but more specifically consists of visualization, orientation and manipulation of structures in space (McGee, 1979). Such ability is thought to be extremely important in anatomy and other clinical specialties (Fernandez et al., 2011). There is evidence to suggest that anatomy experts perform better in spatial tests than novices, especially where metric (depth) spatial ability is concerned (Fernandez et al., 2011). Mental rotation Test (MRT) experiments provide evidence of an association between high spatial ability scores and examination performance (et al., 2001; Lufler, 2011) and performing suturing (Buckley, 2014). These studies suggest that innate spatial ability may be a predictor in different components of learning, including, success, speed and pace of learning, although there are contradictory findings in the literature (Nguyen et al., 2014). For most students, spatial ability is not a skill which is considered relevant to success in higher education, but when students begin to study anatomy their level of spatial ability is an important attribute. In fact, with repeated exposure throughout medical training to cadaveric anatomy spatial ability has been shown to improve significantly (Rochford, 1985; Erkonen et al., 1992; Garg et al., 2001; Aziz, 2002; Fernandez et al., 2014; Berney et al., 2015; Gonzales and Smith, 2016).

Stimuli or anatomical features captured by the visual field, whether through dissection, prosection, ultrasound or living anatomy is processed as Visual Working Memory (VWM) by neurons in the inferior temporal cortex (Sigala, 2009). This creates a temporary and fragile memory trace that must be reinforced if it is to become more permanent. Memory is strongly reinforced when linked to an emotive experience – an evolutionary mechanism associated with survival (Phelps, 2004). However, this connection can be harnessed for the purposes of education. For example, episodic experiences such as seeing a cadaver's heart or seeing one's own heart beating on live ultrasound are context-dependent, and may serve to strengthen meaning, which can facilitate learning and lead to longer-lasting and more stable semantic memories. The sense of touch also plays an important part in the laboratory learning experience. Touch Mediated Perception (TMP) (Smith and Mathias, 2010) is the cognitive process of learning through feeling that gives the individual a tactile perception of a structure (be it hard, soft, squidgy, or hollow etc.). While early attempts of tracking this paradigm have made some progress (Smith and Saber -Shiek, 2015), little is understood of how it might benefit the learning of anatomy directly. It is understood that students learn more when they are actively involved (Biggs, 1999; Vasan and DeFouw, 2005). Active engagement in learning presumably forces our working memories to utilize multimodal stimuli involving consistent dialogue between our pre-frontal lobes and large regions of the neocortex. However, working memory has a short capacity and duration (Milner, 1956). Despite this, having multimodal components to a learning experience means that, once consolidated, there are more cues available to retrieve it (Buschke, 1984). Metacognition is an important aspect of memory retrieval and it relies upon accessing cues or reminders from consciousness (Mazzoni and Kirsch, 2002); the more representations of the learning/memory that exist the greater likelihood of successful retrieval. Therefore, designing activities that capitalize on these features can potentially enhance student learning.

PERCEPTION

There is little doubt that individuality and previous experience play a part in learning anatomy. Student's perception of the subject will influence their attitude and approach to learning. Perceptions are influenced by many things, including media, social media, friends, family, social class, educational background and personal values. Student perspectives on the importance of anatomy are historically very positive, because the association between understanding the human body and being a doctor requires little in the way of explanation. It is therefore unsurprising that studies have shown that students perceive gross anatomy as being extremely relevant to clinical practice (Smith et al., 2011) and that this perception can carry on through medical school (Moxham and O'Plaisant, 2007). A frequently reported opinion from first year students is that the volume of material to learn is a daunting prospect and that not all of it is relevant (Smith et al., 2007). Such perceptions are more predominant with health care and non-science students as opposed to medical and dental students (Tedman et al., 2011; Smith et al, 2014). The overall positive perception of the subject by students is highly associated with the emphasis it is given in their learning. The fact that anatomy teaching time has been scaled back in the majority of UK and US medical curricula over the last 15 years will have done harm to the subject's reputation for being the cornerstone of medicine. However, the hidden curriculum and communication between students outside the curriculum contact should not be underplayed. Learning is not limited to the laboratory or lecture theatre. The hidden curriculum encompasses all that is tacit and implied. Within anatomy education, the hidden curriculum forms a greater extent of a student's learning due to the complex sociological aspects of anatomical study, such as encountering death, challenging religious views and ethical stances of body donation. Students can often learn by osmosis. However, learning through opportunist mechanisms is not guaranteed and therefore should not be relied upon (Hafferty, 1998). It is also likely that students are influenced by each other and by encouragement and engagement by the faculty through streams such as social media (Jaffar, 2012; Jaffar, 2014; Hennessy et al., 2016;).

KNOWLEDGE CONSTRUCTION AND RE-CONSTRUCTION

Learning strategies are developed over a student's lifetime as they progress through schooling, college, higher education and employment. At each stage of their education, the expectations of the institution in which they study changes, and subsequently so too does their approach to learning as the expectations of these institutions change. Students are constantly required to evolve and adapt to the changing educational landscape. Interestingly, previously tried and tested techniques may cease to be effective indefinitely and there will be a need to experiment with alternative approaches (Meyer and Land, 2003). This can be an unsettling time – it is likely that this is the time when students move through new thresholds to develop fresh perspectives on their understanding: they leave behind their old attitudes and beliefs, which can be difficult for them but important for continued progress (Meyer and Land, 2003). An example of a threshold concept is understanding the way in which information flows through dorsal and ventral roots and spinal nerves. Within this example there is a need to understand terminology, knowing where these structures are (propositional knowledge), and then to understand the flow of information through the afferent and efferent nerves which involves a deeper understanding.

In the construction of knowledge students are engaged and immersed in the learning task. Numerous reports have detailed the advantages and disadvantages of different teaching activities and the importance of multimodal teaching in learning tasks (Abraham et al., 2006; Sugand et al., 2010). The way in which a student approaches the learning task can be classified as deep, surface or strategic (Marton and Säljö, 1976). It has become possible to align each approach to learning with varying amounts of engagement (Smith et al., 2009). For example, students who adopt a deep approach are more likely to undertake study before, during and after a teaching session. In contrast, a surface approach learner is likely to only study at the time of the teaching delivery. A student who adopts a strategic approach is primarily driven by success in assessment and therefore will devise a method of study that will focus on core material and examination (Smith and Mathias, 2007; Smith and Mathias, 2009; Wormald et al., 2009; Ward, 2011; Smith et al., 2014). This understanding of cognitive learning is a potentially powerful way of promoting the types of activities which are known to be associated with successful learning outcomes. A schematic drawing of the influences on student learning can be seen in Figure 1. It has recently been suggested that it may be possible to screen 'at risk' students using the Anatomy Learning Experiences Questionnaire (Smith and Mathias, 2011) to identify students in trouble in anatomy sooner rather than later (Zimitat and Choi-Lundberg, 2017).

The use of human cadavers has played an important part in anatomy education for many years. Although anatomists have frequently supported the use of cadavers (Lempp, 2005; Bergman, 2015), evidence suggests it is associated with a deep approach to learning (Smith and Mathias, 2011). This supports the notion that to enable knowledge construction exploring human cadavers is important. The role of context in information processing models of human memory is very well documented (Baddeley, 2010). A series of molecular events taking place in the hippocampal complex aid the initial formation of neocortical traces, but, once consolidated, they can exist independently by establishing more stable neural networks (Nadal et al., 1986).

Working with human cadavers has shown to develop essential transferable and professional skills such as team working, communication and leadership; his development is certainly a core part of the anatomy journey for many students. Some research findings have demonstrated that on occasion students encounter difficulty in working with human cadavers (Quince et al., 2011; Martyn, 2013), and may be due to issues with anxiety. Gentle and suitably paced induction programs can help reduce anxiety (Quince et al., 2011) and im-

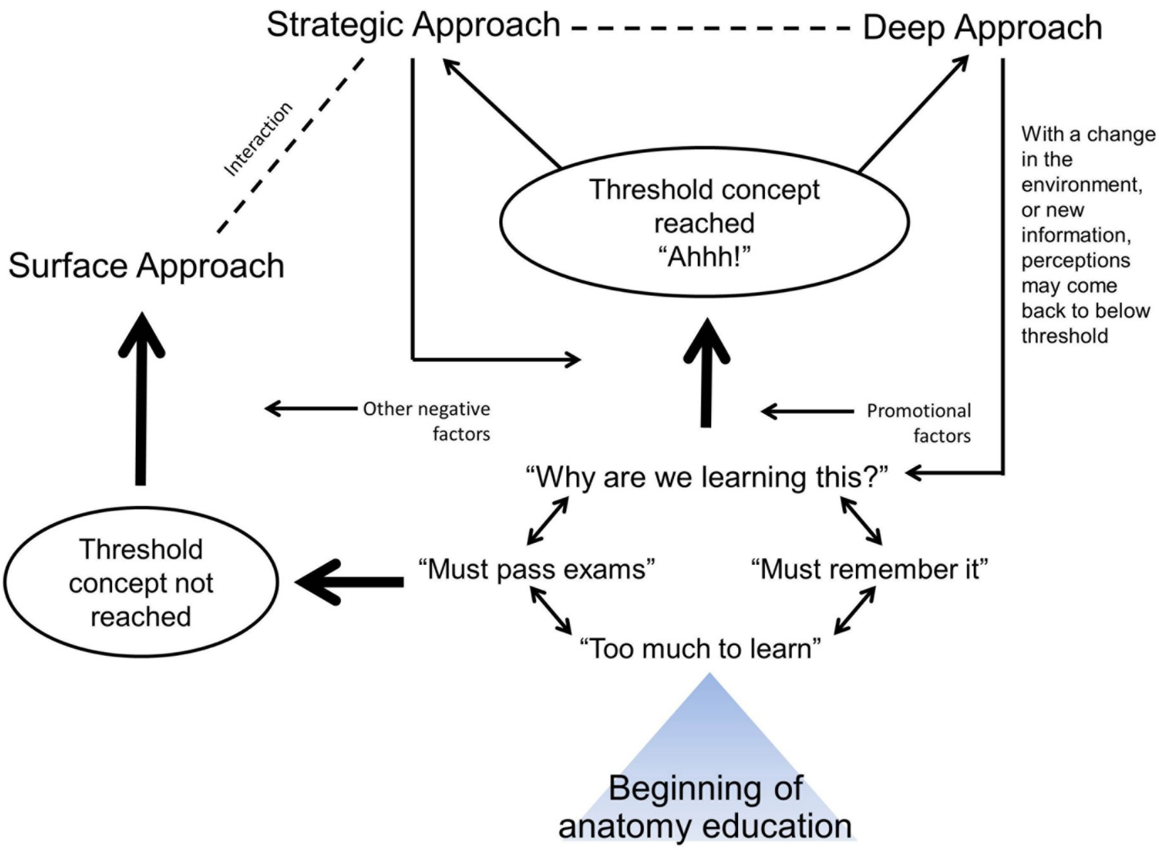

Fig 1.

prove students' perception of anatomy which in turn assists in cognitive and non-cognitive development.

At some point in the future students may need to relearn or reconfigure their knowledge, because the initial route to understanding is superseded by either a greater need or a more sophisticated line of reasoning: for example, knowledge can be challenged via more complex clinical scenarios (termed situated learning) (Maudsley et al., 2000) or through more thorough evaluation of the available evidence. Students can then begin to revisit areas and attempt shorter lines of reasoning, or begin to appreciate where oversimplification of some material has occurred during the curriculum delivery.

One way to explain the concept of construction and reconstruction is to use the example of a student learning about myocardial infarction for the first time. Initially when speaking of clinical signs of this condition, students will have to work through each of the individual steps of their current knowledge base. A heart attack is caused by the partial or full occlusion of the coronary arteries, because the heart muscle is supplied by the coronary arteries. The common branching patterns of the right and left coronary arteries will determine the anatomical location of damage, but variation in branching can also occur. The students use this information in their reasoning to conclude that, if the clinical sign is x, then this is likely to be caused by a blockage in coronary artery y.

Through repeated experience, students continue to restructure their knowledge, eventually reaching a point where knowledge becomes encapsulated (Boshuizen et al., 1995). In the example provided above, experienced clinicians can fast track to the diagnosis because their knowledge is encapsulated as a whole. Using encapsulated knowledge in this way is principally how clinicians work most the time. It is reasonable to assume that some aspects of their work may be protocol-driven and not rely on executive reasoning. Encapsulation involves developing shortened lines of reasoning that rely on having a long-term retention of the base knowledge. Medical decision-making not based on evidence but instead on assumptions or speculation is no longer defensible. A good knowledge base and understanding is very important in minimizing medical error (Dror, 2011). It is worth remembering that students are learning anatomy as a holistic process, particularly when studied as part of a professionalism-led longitudinal curricula (Evans and Watt, 2005; Netterstrom and Kayser, 2008).

In the cognitive domain there is a difference between remembering and knowing. To remember we must reconstruct the learning pathway which often requires cognitive effort and, as such, involves a specific context. However, to know something does not require active reconstruction of the original episode and can be accomplished by the neocortex without the involvement of the hippocampal complex (Moscovitch, 1992). Because of this we form knowledge, which is less susceptible to forgetting and generally independent of context. There is good evidence to suggest that repeated similar context-driven episodes (learning and remembering) are combined overtime to form a semantic network which represents knowledge (Nadal and Moscovitch, 1997). As educators, we must appreciate that, if we do not build a context around our learning, students will have nothing on which to hang their newly learned anatomical knowledge – it will nearly always be forgotten. The use of multiple contexts of learning over time will build knowledge rather than relying upon a conscious recall process. This is because the students will have encountered the learning countless times from various perspectives and can call up the knowledge using a range of cues. In an anatomy and physiology course, a multimodal approach better enabled students to learn (Minhas et al., 2012). These notions very much support the idea of anatomy being taught and examined in an integrated and multimodal fashion.

CONSOLIDATION

Students and trainees need time and experiences that enable them to consolidate their knowledge. Knowledge consolidation involves embedding the restructured learning and using it in practice. In neurological terms this means converting short-term memory to long-term memory and involves a biochemical transformation resulting in more stable and permanent memories (Alvarez and Squire, 1994). Students can increase the likelihood of this occurrence by reinforcing and rehearsing the information. There is some evidence to suggest that the frontal lobe exert control over the newly laid down traces and serve to guide, retrieve, monitor and interpret individual knowledge to enable more sophisticated use of knowledge such as reasoning and problem solving. This complementary system is required if memory is to be used for more than just remembering past experiences (Moscovitch, 1992). Therefore, in order to aid consolidation educators should continuously challenge students understanding by asking them to apply their knowledge in different ways.

A component that should be especially focused on to enable learning consolidation is feedback. As described in Berman (2015), feedback is an essential part of student learning, and without feedback it has been suggested that it is impossible for learners to improve (Mahmood and Darzi, 2004). Feedback should be also appropriate to the teaching activity: for example, Nwachukwu et al. (2015) suggest that neglecting to give students feedback about practical tasks diminishes the importance and limits the potential value of the learning opportunity.

Consolidation can be actively helped by students being engaged as teachers through programs of peer assisted learning (PALS) or near peer teaching (NPT). The inclusion of these initiatives has now become a deliberate element of many curricula (Nnodim, 1997; Santee and Garavalia, 2006; Bulte et al., 2007; Pasquinelli et al., 2008; Evans and Cuffe, 2009; Yu et al., 2011; Hall et al., 2013; Lachman et al., 2013; Shields et al., 2015). The benefit to the student teachers is consolidation of knowledge obtained through the teaching process. NPT also has a positive impact on non-technical skills with improved communication of clinically relevant basic science material and being able to explain complex material (Erie et al., 2013).

Consolidation of knowledge is the end point for knowledge-based assessments for students offering a gateway to the next module or year. A knowledge test is taking a snapshot through any of the stages: creating meaning, restructuring and consolidation based on the program and the individual student. Anatomy propositional and functional knowledge can be assessed in many ways (Brenner et al., 2015). Regardless of the method chosen, it is possible to ask a range of questions which test propositional, functional and procedural knowledge (Smith and McManus, 2015). One key consideration of faculty's setting examinations is the alignment between the learning outcomes and the examination questions. In other words; are students examined in the same way in which they are taught the subject? For example, if students are being taught via dissection/prosection, are they being examined using them too, or are they being assessed by some other method, such as multiple choice questions or written papers? If the latter is true, is this an accurate measure of learning? When asking for the application of knowledge, intentional or not, it makes the examination more conceptually difficult (Sagoo et al., 2016). Recent evidence suggests that students are not always able to make predictions about their own knowledge gain (Finn et al., 2013; Hall et al., 2016), and this may have implications for basic competence levels and patient safety. This suggests a greater need for formative assessments and for students to be educated on how to learn and measure their own anatomical knowledge. (Brenner et al., 2015; Smith and McManus, 2015).

Feedback following assessment is important since it is a time when students are most open to the idea of changing existing learning approaches. Presumably this is because there is direct evidence of ineffectiveness. It is commonplace in the

UK for students to be allowed to review their examination papers with a personal tutor or to see comments on their scripts in a controlled environment. Special focus is often paid to 'borderline' students, although it has been suggested that this is discriminatory – all students should receive equal opportunity to improve irrespective of academic ability. Feedback on non-technical skills can be given during a range of assessment-based activities such as viva's and dissection-base student selected projects.

When encouraging student centeredness we do need to be mindful of the pitfalls. Some activities that students report as a positive learning experience do not always bring about a significant increase in knowledge or examination performance (Hall et al., 2013). In an age of shrinking anatomy curricula (Drake, 2002) students will often turn to watching dissection videos or listening to podcasts in their independent study time, probably because the pace of curricula delivery is fast and they need supplementary resources. It is possible that indulging too frequently in passive activities may lead to the students' feeling more confident about their knowledge but in a non-demonstrable way. Perceived knowledge is perhaps very powerful at engaging and motivating students, but the danger is that it is not always a reflection of true knowledge gain as measured by objective outcome testing (Stephens et al, 2014).

DISCUSSION

The evolution of the student into junior doctor or healthcare professional will create opportunities to revisit areas of anatomy again, either to relearn or to develop and extend existing knowledge. The process of revisiting produces an extending spiral of learning. There is a transition as all learners at some point become teachers and, echoing thoughts of Berman (2015), a teacher does not or should not claim to know everything. As doctors make transitions to educators themselves they complete their journey to become educators of the student they once were.

Learning clinically orientated anatomy is challenging for students. Success is dependent on the ability to constantly adapt and develop the approaches to studying. Success is also based on a balance of cognitive and non-technical skills. The ability to achieve is dependent on a range of genetic and environmental factors. Later, towards the middle of the learning journey, the time will come to apply new techniques, and we as educators must appreciate that changing an educational strategy/approach is stressful for students and they are fearful of doing so without support and encouragement. Students should be encouraged to adopt and range of effective learning strategies, as echoed by Stabile, 2015 students are great innovators (Stabile, 2015). As educators, we need to encourage students to co-construct knowledge and create learning moments. Where possible, technology-enhanced learning should be encouraged to provide flexibility and choice, but there must be a rationale for it. Feedback should be encouraged early on and not just in association with assessments. However, it may be useful to assess students formatively on a regular basis, so their training can be personalized and specific guidance addressing weaknesses can be provided as soon as possible. Where possible students should be given opportunities to teach, this represents as an effective way to learn, but also as a method of developing key transferable skills for employment. We should align our assessments to our learning objectives where possible and have a transparent process. Eventually, knowledge will be encapsulated but learning will continue to be augmented most likely via an organic work-based process which simulates elements of via Kolb's learning cycle (Kolb, 1984). The individual can reflect on their work, modify it and make subtle changes to fine tune their skill set.

TEN KEY RECOMMENDATIONS

Educators should ensure that they:

Design and situate anatomy learning in suitable clinical contexts that reflect practice.

Offer students a wide variety of different learning experiences and opportunities that include both 2D and 3D modalities.

Create opportunities for students to restructure and consolidate their knowledge in a support environment.

Encourage intrinsic as well as extrinsic motivators.

Develop students' engagement in near peer teaching, as all clinicians and health professions are educators of either the public or junior colleagues.

Give students opportunities to apply their learning rather than recall it.

Offer meaningful feedback to students on their learning frequently.

Utilize technology-enhanced learning to increase flexible learning opportunities.

Develop aligned formative and summative assessments that promote and reward a deep approach to learning.

Recognize that all learners are individuals.

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