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A reflection on some key pedagogical competencies, valuable to the role of the medical educator

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ABSTRACT

The role of a university professor is multifaceted; as teacher, facilitator, assessor, evaluator, models of learning themselves as self-directed learners, addressing several key competencies for the effective teacher. It is not only about the transmission of knowledge, facts and skills but also about understanding how a student learns and being able to adapt and differentiate the delivery to personalise the learning. Appropriate questioning to assess prior knowledge and testing or challenging the understanding of the student learning is also a skill for the professor. Being able to access and use a variety of resources is important to deepen the understanding of student learning, including current IT skills. The relationship between learner and mentor is essential, developing trust and confidence. The development of appropriate medical and basic science language is an important element to the learning process.

The professor's collaboration and collegiate practices in a learning community enrich the learning experience, where best practice can be shared and communicated. It is important to be able to measure the impact of the teaching through assessment (formative and summative) and evaluation, which drives continued improvement in the learning experience. The innovative use of resources and environment that supports student and patient-centred learning and effectively engages with the students must be contextually and clinically relevant to the student's experience.

KEY WORDS: Dissemination; Collaboration; Reflection; Personal Learning; Dispersed Leadership; Critical Analysis; Language; Skills; Practice; Knowledge; Leadership; Assessment.

"Tell me and I will forget. Show me and I may remember. Involve me, and I will understand."
Confucius, Philosopher, 450 B.C.

In order to fulfill the role of the university medical educator, key pedagogical competencies need to be considered (Diagram 1). The role of a university professor is multifaceted as a teacher, a facilitator, an assessor and an evaluator, also providing a model of learning as a self-directed learner; indeed, endeavours to be an effective teacher. Added to this, the teacher's own personal learning and development, including being able to work effectively within the context of a team and the ability to evaluate the impact of the teaching, are key factors. Reflective practice, that critically analyses the teaching content and delivery, all contributes to the quality of the impact of the teaching. Good practice is not only about the transmission of knowledge, facts and skills but also about the understanding of how a student learns and the ability to adapt and differentiate the delivery, to personalise the student learning (Srinivasan M, 2011).

Collaborations between university and academic hospitals prove to make very successful partnerships in medical training. The concept of student immersion, in the clinical environment, from the very beginnings of medical training, provides extremely powerful experiences, developing a patient-centred attitude from the onset of their studies. The Kolb model of experiential leaning, of experience, reflection, abstract conceptualisation and active experiment, describes well an integrated patient-centred experiential, medical-training curriculum (Beck A, 2014; Kolb DA, 1984).

Diagram 1. Competencies for the medical educator

Clinicians greatly enhance this experience by disseminating their skills and experiences with the medical students (Reznick R, 2014). Thus, the geography and environment of the medical school can greatly enrich the academic studies

of the medical student and brings clinical relevance to their studies. Implementing this fully integrated, multi-skilled and interdisciplinary programme (involving practitioners, academics and educationalists) can be a daunting task but is usually greatly appreciated by students, who recognize the value of the learning experience in a mutually supportive and inclusive way (Muller JH, 2008; Klocko DJ, 2012).

An interesting aspect of personal learning in medical education, shared by both learners and educators, is that of new vocabulary. Basic scientists extend their own vocabulary with new clinical terms; whereas clinicians extend theirs with detailed basic science language and students take on both. Using a glossary to record all newly acquired words for all parties is an advisable activity. Added to this dynamic learning situation are the international students, who sometimes have deficiencies in English language proficiency whilst also experiencing cultural social and educational barriers by encountering differences in teaching and learning styles (Wang CC, 2014).

Further, on the subject of language development, international students, with English as their second language, have particular requirements with regard to academic support during their medical training, while often their basic science language is adequate. Several personal examples of such support indicate that it takes some students until the third year of study before they acquire sufficient English language skills to access medical education in a problem based environment. One particular international student, in tutorial groups, despite having an excellent standard of English and with an exceptional examination record in his own country, could not cope with the conversational and collaborative style of the group or the rapid exchange of delivery during the discussions. This lack of confidence affected his social interactions and self esteem, becoming clinically depressed during this time, which affected his interactions with peers and some health professionals for special study units. Coaching and mentoring methods were important tools in building confidence in academic ability. As a tutorial group, we decided to consciously slow down all our contributions and exchange of ideas, which proved a useful strategy on further occasions. Another strategy was for the student to prepare a limited number of learning issue questions with the view to present this material confidently during the session. It was arranged with the tutor which of the issues to prompt, with the firm understanding that all learning issues were to be addressed but only a limited number to be practiced for presentation during the session. This allowed the student to gain confidence in contributing and a voice within the group dynamics. Some international students come from an educational environment that is didactic in its delivery and the student would never be expected to question or discuss the learning material. International students that I supported in following years continued to develop their assurance in language ability using these and other methods with their tutors. Understanding the difficulties encountered by these students needs to be seriously considered by medical educators.

"the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (**Lev Vygotsky, psychologist**).

Expert knowledge is an essential requirement, when teaching medical science, and excellent communication of specialist subject knowledge, with clearly defined goals that inspire, motivate, stretch and challenge all students, lead the learners through their 'zone of proximal development' (Vygotsky LS, 1930). This is essential for the effective transfer of knowledge from educator to learner to ensure optimal potential is achieved in the achievements of the student. Maintaining continuity and progression of the material to be disseminated, draws the student onwards to completion and success. Further, a confidence and understanding in the taught subject matter gives academic credibility to the teacher and this can be very encouraging for the student, enables the lecturer to discuss the teaching material creatively, according to student responses and understanding. The alternative is labouring, point-by-point, slide-by-slide providing 'death by PowerPoint', whereas an expert in educational practices can differentiate the concepts in a student-centered way. The conceptualization of expert knowledge needs to be accessible and relevant to the learner and a scaffolded structure of this must be considered in the delivery of the subject, without too much complicated detail to confound the student (Kusurkar RA, 2015). Constructing the scaffold should be part of the educational skill of the lecturer, where the practitioner is aware of the needs of their students and can support them through difficult areas. (Hogan K, Pressley M, 1997).

"The average teacher explains complexity; the gifted teacher reveals simplicity." **–Robert Brault, free lance writer**

It can be a challenge for basic scientists to ensure that the medical science teaching is clinically relevant for the medical students. Injecting context into scientific detail is usually well appreciated by the learners. This can be an important item of self-directed learning for the non-clinical lecturer to achieve this. Networking with health care professionals can be a useful approach for this learning. Co-teaching and multidisciplinary team-teaching is a very rewarding experience for both teachers and learners (Gillham D, 2015, Manusov G, 2013).

An unpublished action research pilot case study was performed as an investigation into our management of Biomedical Science MSc projects within a postgraduate department of Plymouth University. This involved the gathering of information about attitudes, beliefs and concerns held by students and mentors within that group. Eight of the students and nine mentors completed questionnaires and were interviewed about the management of the research projects. It was concluded, in this small study,

that an understanding of a student's particular learning style actually aided the student/mentor relationship from the student perspective and that an understanding of teaching and learning theory is valuable for mentors in enhancing the student experience.

Although research is extremely important in a university, for it's funding and purpose, perhaps the educational element and the learning experience of the student should be considered as a greater priority. This is especially poignant now that our paying students are considered to be consumers of an educational product. Some professors, with exemplary research background, are actually reluctant to teach as they lack the skills and confidence while desiring to engage more in their research activities. The concept of student centred-learning must be considered in the support and development of the individual student (Bligh J. 2010; Spencer JA and Jordan KR, 1999).

It is important not to 'blind the student with science', without regard for the relevancy and appropriateness of the teaching, however excited the researcher is about their own acquired subject knowledge.

'Do not try to satisfy your vanity by teaching a great many things. Awaken people's curiosity. It is enough to open minds; do not overload them. Put there a spark. If there is some good inflammable stuff, it will catch fire.' **Anatole France, novelist**

Within the competencies discussed here, there are several transferable skills and some professional understanding to consider. The lecturer's own professional experience and ability provides critical analysis, scientific reasoning, conceptual and procedural knowledge and investigative skills as valuable transferable assets for learners. Added to these are the 'soft' skills, such as, being able to model self-directed learning, explaining knowledge to others, collaborative skills and developing teamwork.

The professor's own collegiate practices in a learning community, both collaborative and international, also enrich the learning experience, where best practice can be shared and communicated. It is important to maintain the learning community of researchers, teachers and practitioners, within the dialogue between members of the community, to sustain and support the medical education environment (van der Vleuten CP 2014).

Modelling mature leadership qualities is also beneficial to the students. The ability to recognise the strengths and weaknesses in oneself and those around you enables the lecturer to develop excellent working and learning relationships with peers and students. Recognising potential and the reasons that may hold back an individual in their performance is crucial to facilitating a student to achieve their optimum own potential. Attempting to secure the true potential of a learner, by strong autocratic leadership, can produce a culture of dependency and permission-seeking, that can develop through a top down, hierarchical, immature leadership style (Bligh J and Brice J, 2010). Medics need to be good decision makers and have excellent collective leadership skills in their professional environment, through sharing excellence. Whereas academic leaders are responsible for creating a learning culture that forges a path for learners. Maturity in leadership requires shared authority with teams with high trust of each other, as opposed its antithesis of personal power, hierarchy and low trust relationships (Diagram 2) (West Burnham J, 2004).

"My job as a leader is to make sure everybody in the company has great opportunities, and that they feel they're having a meaningful impact and are contributing to the good of society." **Larry Page, Google cofounder and CEO**

An academic, who engages in teaching, may benefit from developing the skills of active listening, when nurturing teacher-learner relationships, thus enabling the lecturer

Diagram 2. Overview of medical education teaching
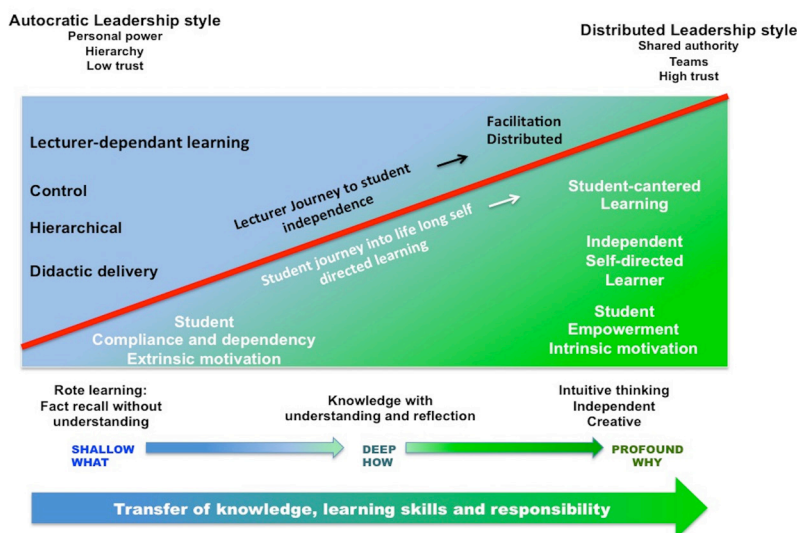
to understand the student's learning needs with regards to learning style and ability, but also to be able to listen and respond to feedback from the learner and from peers. It is also important for the learner to be able to provide honest and helpful feedback in response to their personal experience. Participant feedback is a strong stimulant to promote change with development in the curriculum and to drive forward innovation in medical training (Roberts JK, 2015; Archer JC, 2010; Hollander H, 2002).

Coaching and mentoring methods in one to one student meetings are a good support system for learners. The coaching models developed by Boyatzis and Whitmore's 'GROW' model, used to develop reflective techniques, encourage students to consider their best options and choices for the individual's intention to change (Barbara Buddeberg-Fischer and Katia-Daniela Herta, 2006; Eva M Aagaard, MD and Karen E Hauer, 2003, Whitmore J, 2009). Similarly, the Johari window is another useful model in the toolkit for professional development both for student and for lecturers (Verklan MT, 2007). Kirkpatrick's four levels of learning evaluation is a useful model for implementing improvements in the medical training experiences (Anderson E 2015; Kirkpatrick D 2008).

'Learning walks' are an interesting way that one lecturer can support another as a 'critical friend'. The colleague sits in on a session of their peer and then comments on the session with helpful suggestions on strong points and things to consider doing differently. This relies upon high degrees of trust between the partners in their working relationship coupled with good coaching/mentoring skills. Another method to achieve this is by videoing the session and requesting for someone to review the recorded delivery, ideally together (Fisher D and Prey N 2014).

Creativity in curriculum and module design, using innovative design and content, can greatly enhance the student learning experience (Bleakley A 2009, O'Connor Grochowski C, 2007). True educational innovations are those products, processes, strategies and approaches that improve significantly upon the status quo. The application of different modes of delivery accommodates the four main different sensory modalities (visual, aural or auditory, read/write, and kinaesthetic), where methods of teaching and learning provide equity and equality of opportunity for different students in order to reach their full potential (Richard RD, 2013; Mcleod SA, 2013). Different learning environments in addition to lecture theatres, such as, small groups, workshops, field trips and work placements enable a contextual element to student learning. As most doctors will need to teach at some time in their career, the experience of vertical transmission of knowledge is an example of a different mode of delivery in the university setting, where more advanced medical students instruct the less knowledgeable. Experiences of this are largely positive, building self-esteem and shared experience in communication for peers further advanced in their studies. The development of much valued learning relationships between students is an important aspect where learning relationships involve trust and mutual respect. The

quality of vertically transferred knowledge must be quality assured, as there could be a 'Chinese whispers' effect where the knowledge may not be as accurate as an expert in the subject may wish it to be.

Education training can be difficult to integrate into a research or medical career and may sometimes be undervalued (Bligh J 2010). Understanding how to bring clarity to aims and objectives, when designing the curriculum, can provide a valuable study guide for the student and is an important aspect of training in pedagogy. Encouraging conceptualization and developing key concepts through the learning can be beneficial for recalling knowledge and to deepen the understanding of the learning (Novak JD, 1998, Jarvis P, 2006). In the case of a problem based learning (PBL) curriculum for medicine, the apparent lack of syllabus can make students anxious. Signposting these aims and objectives in the form of a study guide can endue the student with more confidence in navigating their way through the curriculum (Thurley P, Dennick R, 2008; Nandi PL, 2000). The concept of the facilitation of learning is essential for a PBL-style, small group-teaching environment, where the skills are in directing and signposting the students to the knowledge resources (Subramaniam RM, 2006, Wood D, 2008). PBL facilitation involves a quite different skill set and leadership style but still is greatly enriched by the expert knowledge of the facilitator and their ability to provide engaging questions that point the learner in the right direction. However, this method of curriculum delivery can be very challenging to the lecturer and the student alike. However, students often learn best together in a collaborative approach with co-creation, co-construction and cultivation of clinically relevant knowledge. The experienced facilitator, within the PBL culture, initiates discussion, facilitates learning and while maintaining focus, then adjudicates. The group requires a shared sense of purpose with clear values that emphasize working together. They are able to learn through experience and prepared to share leadership according to group requirements. Knowing that expert knowledge is available from the facilitator, if required, is encouraging to the PBL learner in this environment, as occasionally, there are concepts that need to be addressed by explaining a difficult issue in the more conventional approach. As students gain confidence in PBL activities, the need for conventional instruction or intervention recedes. The research skills gained from this activity are beneficial for life-long learning skills for the learners' future career and are another transferable quality that can be gained from the lecturer. Indeed, do we wish to 'cut and paste' knowledge' or 'graft and transplant' (Hartley J, Benington J, 2006)?

Gaining the perspective and insight of educational theory with the knowledge of how learners learn, provides a rich environment of experiential learning, resulting in the development of profound understanding of the foundational knowledge, thus providing a broad, deep and more exciting education. The educational aim is for profound understanding of the foundational knowledge, enabling learners to make insightful and intuitive decisions

as a clinician (based on the understanding of basic science) not the shallow knowledge when just memorizing facts. (West-Burnham J, 2004). It should be noted, however, that shallow learning might begin the process that promotes deeper understanding followed by conceptualization and development of complex networks of memory (Novak J, 1998).

'Thought is not derived from action but tested by application' Dewey

Students often need to be able to visualize their learning and this can be a key factor in memory and understanding; this may be both in the form of mind mapping in small groups or in their own personal study periods (Hay D, 2008). Brainstorming is an excellent way of visualizing prior knowledge, which can then be conceptualized. The development of concept maps can consolidate knowledge for the student and provide excellent *aide memoire* for revision purposes (Hay D, 2007; 2008). Teachers can also use these tools to design their curriculum and lectures.

Revisiting subject knowledge before extending and developing further understanding, can enhance recall and comprehension by prompting previously stored information (Christen WL, Murphy TJ, 1991). The excellent system of spiral curricular, as demonstrated by Plymouth University School of Medicine and Dentistry, which revisits human body systems each academic year, with horizontal and vertical integration of topics including increased areas of pathophysiology of disease, is an example of this principle of revisiting prior knowledge being employed successfully (Coelho CS, 2015).

The lecturer's own confidence in their subject, injects enthusiasm into the teaching, enabling the teacher to be flexible with the material and to interject with stimulating and engaging questions, to improve and deepen understanding, as the session progresses. This Socratic method of asking questions throughout the teaching session can have some prepared questions, designed to engage students. The ability to devise new engaging questions, relevant to the student learning, as the teaching session progresses, can deepen the understanding of the knowledge that we present. This is a skill that can be developed with practice (Woolliscroft JO, 2003). The development of curiosity in the students is a key factor in promoting self-directed learning by introducing a variety of stimuli and unexpected information to promote further investigation. Indeed, ipsative learning, emanating from the student himself or herself, is a valuable goal to aim for with autonomy supportive teaching (Kusurkar RA, 2011).

'It's a miracle that curiosity survives formal education' Albert Einstein

The continued professional development of university lecturers may not only be educational theory, management and research skills but can also include technical IT training. The necessity for lecturers to maintain their IT skills through continued training cannot be emphasized more in order to communicate as effectively as the students interact with each other. Current IT skills are essential in providing a relevant distributed learning environment for students who are digitally 'natives' in today's electronic environment. The learning environment and the resources that support student learning are extremely important, as is the planning, delivery and content of the subject matter. The ubiquity of inexpensive and powerful mobile devices is creating the potential for all students to learn at any time and in any location (Martini effect, any place, anytime, anywhere). Increased wired and wireless broadband is creating the potential for learners to engage and interact with peers and experts around the world wherever they are.

Many universities already have a form of 'flipped learning' using streamed lectures and the opportunity to contribute feedback in the small groups using a Wiki space. Feedback, such as, thoughts, questions and opinions, can be contributed in 'real-time' during highly populated lectures using an android or iPad and visualized on the large screen.

The advantages of networking using IT enable academics of the same discipline or different disciplines to discuss and develop ideas and share knowledge and best practice from different academic establishments worldwide. Metacognition, by looking at other countries' thought processes, helps us to reflect on our own practice and adapt relevant factors from other cultures and systems. This is another activity that a lecturer can transfer to the student, taking control of our own destiny and seizing the opportunities provided by the dynamic evolution of technology, creating value for the students (Masic I, 2008).

Humour is an extremely underrated, yet useful, tool for communication, as it helps to develop the learning relationships. Laughter is also thought to help students to remember the material in the lecture and involves complex cognitive processes as is relating personal experiences associated with case studies (Campbell DW, 2015; Bains CG, 2015; Masukume G, Zumla A 2012).

It remains to discuss the thorny issue of assessments; its value and purpose. Apart from ensuring academic rigor, the assessment of student learning informs educators of the impact of the teaching and the ability of the students. Although assessment is an extrinsic motivation, a student's sense of achievement can make the experience intrinsic when the student is motivated towards the target of excellence in assessment. Longitudinal summative progress tests minimize test-driven learning strategies, and are designed to test functional knowledge or competence (Lambert WT, 2012; Rickets C, Bligh J, 2011). Formative assessment can be just as effective, to promote learning and self-directed learning as summative assessment and can be used to consolidate the knowledge acquired (Hudson JN, Bristow DR, 2006). Engaging students in exploring case scenarios, using their learning to solve problems and deepen their understanding of subjects, can develop useful formative assessment.
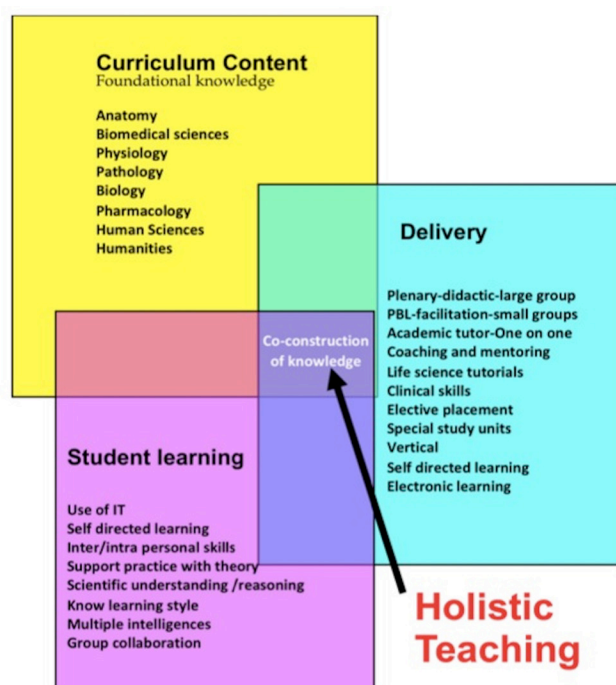
Diagram 3. holistic teaching approach

The use of portfolio assessments can be a great advantage when recording the clinical experiences of patient cases. It integrate the academic physiology and anatomy with pharmaceutical elements as well as pathology and the human sciences in an integrated and comprehensive way. It can also be performed with creativity and innovation in the way that foundational knowledge is presented.

Work-based placements are an excellent learning experience for health care professionals, with formative assessment, involving reflection and feedback, which prompts appropriate supervision, however, multiple methods of assessment have been reported to be the best methods to assess ability (Michel C, 2011).

Personal experience has convinced me of the importance of formal training in education and pedagogy (andragogy) both from valuing my own postgraduate training and by observing the experiences of my peers (Klocko DJ, 2012; Martins A, 2010). The holistic approach of an engaging and experiential curriculum that is delivered in a variety of ways to suit all learning styles, (Kolb DA, 1976,1981) with educationally trained lecturers, using multiple modes of engagement by the student, can provide excellent training for medical students (Diagram 3). A combination of PBL, contemporary and conventional curriculum has been the most effective methods of medical training for undergraduates developing scholars of medicine who are life-long learners (Nandi PL, 2000).

To conclude, the lecturers must be able to adapt with excellent solutions to meet new and relevant requirements for the medical student's learning experience with a shared commitment to learning and growth and require key pedagogical competencies.

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