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Engaging Medical Students in the Basic Science Years with Clinical Teaching

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ABSTRACT: Education of future medical practitioners involves the stewarding of knowledge and skills, and the development of values required for responsible practice. Students must not only master a vast amount of knowledge and theory but also understand how to apply it. A key challenge for medical educators is to approach this in a balanced and integrated manner, particularly within the basic science years of the medical program. The purpose of this article is to consider how the clinical environment, teaching methods, assessment, and feedback impact on the engagement of junior medical students.

KEYWORDS: medical curriculum, bedside teaching, teaching methods, peer assisted learning, problem based learning, team-based learning, assessment, feedback

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Introduction

In medical education, knowing what emphasis to place on development of scientific knowledge, clinical reasoning, clinical skills, and professional development is difficult.[1] University education of professionals involves preparing students for responsible practice. Students must, therefore, master a vast amount of knowledge and theory and know how to apply it. The key *goal* of medical educators is to steward knowledge, impart skills, and instill the values of the medical profession.[2] The key *challenge* for medical educators is to approach this in a balanced and integrated manner, particularly within the basic science years of the medical program, traditionally known as the "preclinical" years. Currently, there is paucity between what we know about how adults learn and the way medicine is taught. Even though junior medical students require basic scientific knowledge, their understanding of information is more readily learnt when explained within the relevant clinical context.[3] Furthermore, direct and active participation, with opportunities for practice and assessment within an authentic context, promotes retention and recall.[3,4]

Medical curricula is often outweighed by the scientific aspects of medicine to the exclusion of social humanistic aspects.[5] However, learning within medicine involves a socialization process that assists in the development of students' professional identity. Medical student education occurs both at university and hospital campuses. Largely, curricular activities at the university aim to develop students' scientific knowledge, while those at the hospital aim to contextualize this knowledge and develop students' clinical skills and professionalism. Learning that takes place in the hospital setting fosters enduring elements of practice that cannot be learnt from books. Distinct from knowledge, practical elements, including ways to interact with patients, are better understood within authentic learning environments.[6,7] Being new to the hospital setting, junior medical students can find hospital-based curricular activities particularly challenging. This requires an integrated approach to teaching in order to orientate students to the social aspects of medicine.[8] Students need to be offered meaningful opportunities to participate,[9] as it is only through participation that new skills can be learnt.

This paper considers how the clinical environment, teaching methods, assessment, and feedback impact on the engagement of junior medical students.

Discussion

Learning experiences for students are only as effective as the students' engagement with them. Some experiences may be highly invitational and supportive for students, while others might inhibit their efforts to learn. Engagement of junior medical students, particularly in preparation for their full-time clinical senior years, may be increased through affordance of patient contact, well-planned tutorials, teaching by role models, meaningful interactions with senior peers, and collaborative learning opportunities.

Affordance of patient contact. Supervised involvement in patient care, with opportunities for practice in clinical skills, provides a powerful stimulus for student learning.[10] Indeed, bedside teaching, including history-taking and physical

examination, lies at the heart of medical education, and opportunities for participation are highly valued by students.[11] Bedside teaching provides an opportunity for clinical skills and patient care to be taught by example. Interaction occurs between the patient, the tutor, and the student to promote deep student engagement. Unfortunately, however, in recent years, there has been a decline in the estimated time that medical students spend at bedside teaching. Obstacles include short patient hospital stays, busy schedule of tutors, and lack of faculty training.[12] Teachers often avoid the bedside as a place of teaching, and sometimes lack experience and adequate training.[13] Additionally, tutors may feel uncomfortable teaching in the presence of a patient, even though research has shown that patients generally enjoy, and sometimes benefit from bedside teaching.[13] Those new to medicine require repeated opportunities to practice history-taking and examination skills under the guidance of experienced clinical teachers, while working toward a high level of proficiency.[1] However, in a recent survey of 265 first-year medical students at Sydney Medical School, we found that only 63% of students reported that most of the teaching during hospital-based physical examination and history-taking clinical tutorials takes place at the bedside.[14]

Tutorial outcomes and structure. Several factors determine the depth and breadth to which students are able to embrace their clinical learning experience. These include the structure of the tutorial, the teacher's understanding of the learning objectives, and the attitude of the clinical tutor. There is clear evidence that teachers need to plan before commencement of a tutorial.[15] A lack of clear outcomes and expectations, as well as a lack of congruence with the curriculum, is a common problem within clinical teaching.[11] Additionally, tutorial activities need to be pitched at the right level, and aligned with the individual's learning needs, with the level of challenges being progressively increased.[16] Literature suggests that tutorials are frequently pitched too high.[11,17] Although students need to be afforded meaningful opportunities for participation in tutorials, an optimum balance between supervision and autonomy within clinical tasks is required.[18] A formal introduction and preparation at the commencement of each tutorial, away from the bedside, can maximize students' learning experience on the wards. Furthermore, the content of the tutorials needs to be aligned with the curriculum.[17] For new knowledge to be actively acquired, sufficient time must be provided for new clinical experiences.[19]

Clinical tutors. The teacher is one of the most powerful variables in the educational setting. Although subject expertise is important, this alone is not sufficient to make a good teacher.[11] Equally important are the teachers' actions, attitudes, and enthusiasm for the subject.[11,20] Yet medical students are often taught clinical medicine by teachers who may not set the best example of a clinical teacher.[1] In the hospital setting, clinical tutors act as socializing agents in demonstrating the expected culture and professional values within medical practices. Clinical tutors are often viewed as role models and play an important part in exemplifying professional identity in medicine.[21,22] Role models assist students in development of their professional competencies, values, and attitudes.[23] Characteristics of a positive role model include clinical attributes, teaching skills, and personal qualities.[24] Our recent study of 265 first-year students' perceptions of their clinical teaching at Sydney Medical School reinforced the important function of clinical tutors as role models.[25] Key positive examples set by clinical tutors included a good knowledge of general medicine, empathy and respect for patients, provision of a positive learning environment, understanding of the curriculum, meaningful feedback, and enthusiasm for both teaching and medicine.[25]

Peer-assisted learning. Peer-assisted learning (PAL) activities in the hospital setting, including peer tutoring and peer assessment, offer meaningful opportunities for junior students to participate in activities within a formal, professional context. In fact, in the past decade, there has been increasing international interest in formally organized PAL within medical schools.[26–28] PAL offers many benefits at several levels. For teaching hospitals, PAL can alleviate faculty teaching burden,[29] offering potential resource-saving measures. This potential saving is particularly relevant given the increasing number of medical students undertaking early clinical activities, in what was previously considered preclinical years.[29,30] Additionally, PAL has the potential to address specific gaps within the curriculum.[31] For junior students, PAL provides additional student support and opportunities to practice in preparation for assessments.[26]

Formative assessment and feedback. While exposure to clinical teaching and positive role models within the hospital setting in medical education is important, this alone is not enough. Effective learning requires effective means of formative assessment and feedback. A long-held aphorism is "assessment drives learning", and therefore offers an important means to engage students in learning. Assessment has the power to influence student values, and reinforce competence.[32] Even the most junior students need the opportunity to compare their performance against a standard, and to practice until a set level of proficiency is attained. Student formative assessments have been changed in recent years to suit assessment of clinical competence and performance in the clinical setting.[33] There are a number of formative assessment methods specifically designed to facilitate direct observation of a student performing a clinical activity, such as history-taking. A typical example of this format is the min-CEX, which is carried out on the wards, with a real patient, and involves[17] an observed focused history-taking or focused physical examination.

Whatever the method of assessment, the provision of feedback should be viewed as an absolute necessity in clinical education. Yet, there is a general belief that there is inadequate feedback within medical education. Students often complain that they are given insufficient feedback as they progress, and when it is given, it is often vague and unhelpful.[34] The ability to competently take a history and examine a patient forms the mainstay of medical practice.[35] The ability, therefore, of clinical teachers to directly and accurately observe students'

performance of history-taking and physical examination, and provide effective feedback, is a crucial aspect of students' medical training. Clearly, assessment and feedback should always be based on direct observation.[35] In fact, it has been suggested that, in order for the feedback to be accurate and helpful, direct observation is required by the same tutor in a number of patient interactions.[34] However, teachers often fail to make first-hand observations of a student's skills.[35] Without observation, good performance cannot be reinforced, and errors may go uncorrected. Junior medical students' sense of "being adrift in an unfamiliar environment" is amplified by lack of feedback.

Collaborative learning. Of course, immersion into the clinical environment is not always essential to student engagement. For example, collaborative learning activities away from the hospital setting, where students work together in small groups toward common goals, can assist in developing team-building skills essential for medical practice.[36] Two examples of collaborating learning activities include problem-based learning (PBL) and team-based learning (TBL). While PBL has long been held as the cornerstone of many medical education curricula, TBL has gained recent international popularity within medical education, particularly in the past 10 years.[37] Our recent systematic review reported that most iterations of TBL within medical education take place in the preclinical years, across multiple disciplines.[37] Both PBL and TBL provide a learner-centered approach, where students build on their own learning, and work in small groups to solve professionally relevant problems. Both approaches make use of the advantages of small-group teaching, and ensure that learners are engaged in real-life problems that provide a clinical context.

Conclusion

Medical students' knowledge, thinking, and learning are grounded in experience, and are bound to the social and physical context. A balanced and integrated design and delivery of the first 2 years of the medical curriculum is required to ensure that the scientific aspects of medicine do not outweigh the social humanistic aspects. Understanding of information is more readily developed when explained within the relevant clinical context. Consequently, the provision of meaningful learning opportunities for junior students within the clinical environment is a requisite to student engagement. Additionally, effective teaching, assessment, and feedback methods, with excellent tutors as role models, will help enrich the learning experience for students.

Author Contributions

AB and CM jointly developed the structure and content of the paper. Both authors agreed upon and approved the final manuscript.

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