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WEB PAPER

The good student is more than a listener – The 12+1 roles of the medical student

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Abstract

Background: The process of medical education, particularly in the fast evolving new era of medical metaschools, is a broad and complex issue. Harden & Crosby claimed that a good teacher is more than a lecturer, and identified 12 roles that certify a good and capable teacher. However, this is only half the truth: the good student is more than a listener. Teaching-and-learning is not simply a one-way process, and, as medical students are not children, the relationship between teacher and students involves andragogy rather than pedagogy. We therefore propose the 12+1 roles of the student.

Summary of work: The Harden & Crosby paper was distributed in a class of 90 third year Ioannina University medical students, who were asked to think about the student's roles. A small discussion group brainstormed ideas, which were then refined further by the authors.

Summary of results: 12+1 roles of the good medical student were produced and grouped into six areas: information receiver, in lectures and clinical context; role model in learning, in class, with the added subarea of comparative choice of role models; teaching facilitator and teacher's mentor; teacher's assessor and curriculum evaluator; active participator and keeping-up with curriculum; resource consumer/co-creator and medical literature researcher. The ideal student should fulfil the majority if not all of these complementary roles.

Take-home message: These 12+1 student's roles are complementary to the 12 roles of the teacher and help reshaping our understanding of today's medical education process.

Introduction

The students and changes in medical education

The increasing emphasis on student autonomy in medical education has moved the centre of gravity away from the teacher and closer to the student (Harden & Crosby 2000). It is becoming ever more important to find out 'what happens to the student', because contemporary educational theory gives students considerable responsibility for managing their own learning. It is commonly accepted that nowadays, particularly in the fast evolving new era of medical metaschools (IVIMEDS 2005), the classic methods of teaching are being replaced with new ones on account of new challenges in medical education.

The expectations of students in a learner-centred approach are vastly different from a traditional curriculum. The principle of active participation of students in managing their own learning inside a supporting environment is common, as medical education becomes an effective feedback between teachers and students. The use of student-determined learning objectives provides a cooperation environment between teacher and students. That symbiotic relationship between learning theory and curriculum models enhances the efforts of students. Furthermore, 'today's medical students are not only tomorrow's doctors; they are also tomorrow's teachers' (McLean & Gibbs 2010). Consequently, Harden & Crosby's

Practice points

- The increasing emphasis on student autonomy in medical education has moved the centre of gravity away from the teacher and closer to the student.
- Harden and Crosby identified the 12 roles of the teacher, but this is half the truth. The other half is that the good student is more than a listener, as teaching & learning process does not occur one-way.
- The 12+1 roles of the student are grouped in six areas: information receiver – role model – facilitator – assessor – plannee – resource consumer.
- The ideal student should fulfill the majority if not all of these complementary roles.
- 'The roles of the teacher' is half the truth. The remaining half concerns 'the roles of the student'. A student-centred approach should consider the student's roles as being at least equally important as the teacher's.
- This consideration broadens our understanding and paves the way for new research domains in modern medical education.

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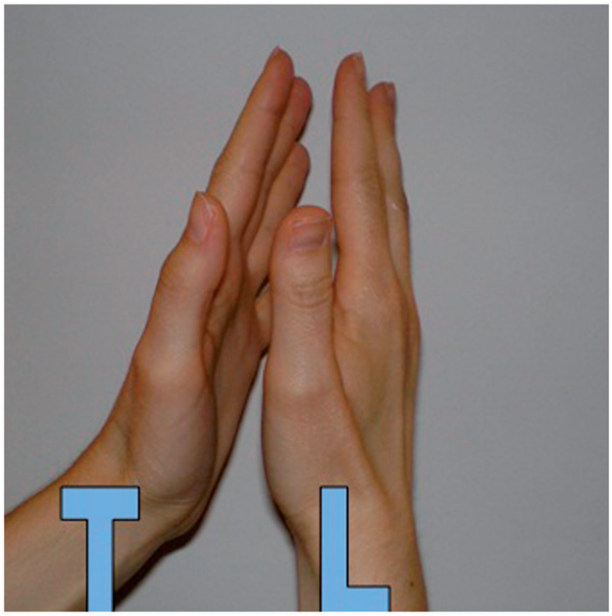

Figure 1. The Teaching & Learning process is like the human hands collaboration. We need two hands to wash our face.

description of the challenging roles of the teacher (2000) has direct implications on the definition of the not only challenging, but also meaningful roles of the student. What precisely are the roles of today's student?

Material and methods

Identification of the roles of the student: Work done

We carried out a literature search in Medline, using the algorithm 'medical students' roles', 'education', 'students' participation'. Except for the 1998 report by Visser et al. on the Maastricht experience involving students at all levels of curriculum organization and recommending that medical schools recognize the ability and the value of involving medical students in the management of medical schools, no other relevant paper was retrieved. We also searched manually all AMEE Conference 2001 to 2009 abstracts, as well as the recent issues of *Medical Teacher*, *Medical Education* and *Clinical Teacher*. No relevant paper was found.

Although it describes 'the other side of the river' i.e., the teacher's side, Harden & Crosby's paper was therefore considered the most relevant publication (2000). Thus, in order to identify the student's roles, we thought it a good idea to mirror the teacher's roles.

Our reflection was helped by the use of metaphors, such as likening teacher and student to the two human hands: they are not right and left, they are teaching and learning; without the one or the other hand, the learning procedure cannot be done properly (Figure 1). Another metaphor could be that the teacher's and student's roles are like the double DNA helix (Figure 2).

The Harden & Crosby paper was distributed in a class of 90 third year Ioannina University medical students who were asked to think about these roles. The ideas of the initial group were collected. A smaller discussion group brainstormed these ideas, which were classified into three categories: (1) student – teacher contact, (2) learning expertise, (3) student expertise. These categories were refined further by the authors.

The 12+1 roles of the student: The results

In total, there were 12+1 roles of the student that were identified. Six areas of student activity were first defined, namely the student as: information receiver, role model, facilitator, assessor, planner, and resource consumer. Each of these were further subdivided into two roles, except for the area of role model which was divided into three, making a total of 12+1 roles as illustrated in Figure 3. To help the reader's reflection, Figure 4 from the Harden & Crosby paper can play the role of the other helix of the DNA metaphor.

Let us further explore in detail each of the identified student's roles. Although nowadays in many countries in Europe almost two thirds of medical students (and doctors) are women (Zaat et al. 2008), for the purpose of readability of this manuscript we will use the masculine gender of both 'the student' and 'the teacher' and refer to their respective roles as 'his' rather than using 'his/her' repeatedly.

1 The information receiver

1.1 The listener/ the lecture attendee

> Some people talk in their sleep.
> Lecturers talk while other people sleep.
>
> *Albert Camus*

From the point of view of lecturing, it is explicit that one important role of the student is to be listening. According to Camus (2008), this role consists of not letting lecturers put students to sleep. The key to success lies in both partners accepting their responsibility: the teacher's responsibility is to master the information and to present it to the students in a knowledgeable way, and the students' responsibility is to make sure they understand it enough to be able to relate it to past knowledge. For example, students could use some of the information they learn in the classroom and at hospital as a stimulus for extra learning. They can access the Internet or open some of their medical textbooks in order to extend their knowledge on a specific topic. They can also try to teach it to their colleagues, so as to confirm that they definitely understood it. The information consists of a description of some phenomena that need to be explained. When trying to explain the phenomena, students discover what they already know about the problem, but they also discover what they do not yet know or which questions still need to be answered and require study (Dolmans et al. 2005). Finally, the practice doing has the most important role in the educational process; students apply what they have learned in the lesson and also realize that any query of the procedure is solved by practice.

Colleges are learning communities, and individuals accepted into these communities have the privileges and responsibilities of membership. The listener has social responsibilities as a participant, since he is *Tomorrow's Doctor* (GMC 2009), and needs to be more than merely a

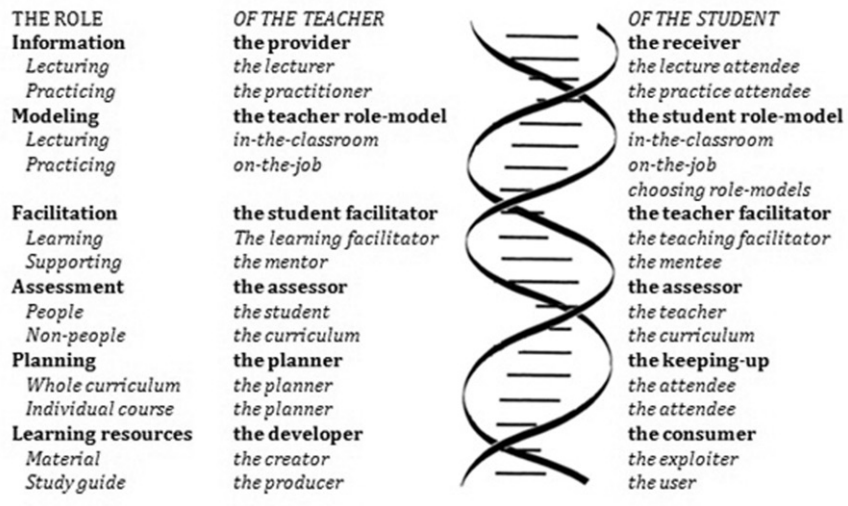

Figure 2. The double helix of both teacher's & student's roles.

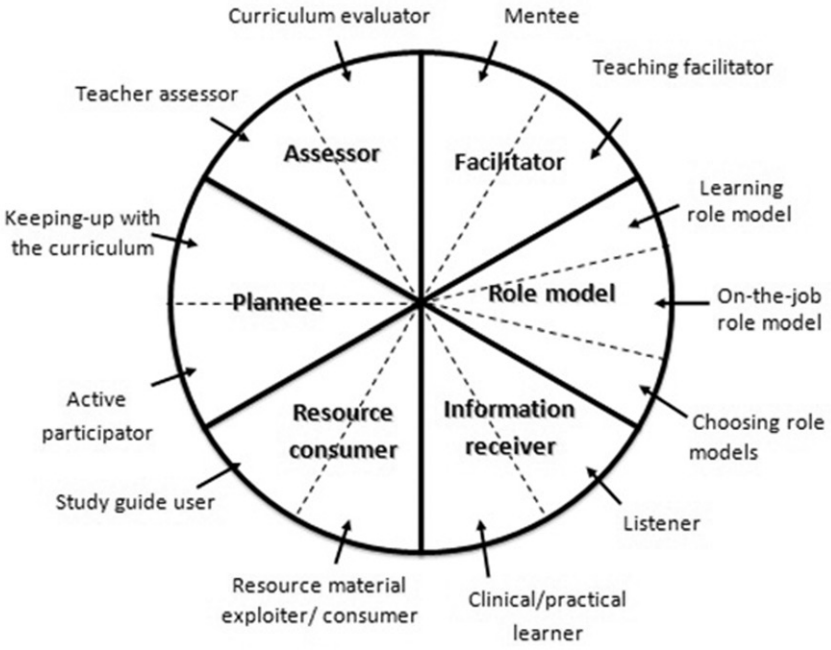

Figure 3. The 12 + 1 roles of the student, as proposed by Ioannina 3rd year medical students.

passive recipient of information. The lecturer has offered his view, but its use remains the responsibility and a prerogative of the recipients as they integrate what they hear into their established knowledge and in doing so, they have the opportunity to reshape it (Long & Lock 2008).

Before a lecture is delivered, the listener should take a little time of preparation, even if it is only to ask himself 'Why am I here? What do I know of this subject?' and call to the front of consciousness his present understanding. It is not unreasonable for the listener to challenge either his own thoughts or the arguments of the lecturer, as this level of mental engagement facilitates the active process of learning, develops additional connections and aids long-term memory. This means that learners should be prepared to become lifelong learners who are able to acquire new knowledge and skills rapidly. The student should be involved actively and should be stimulated towards activation of prior knowledge, elaborations and deep learning because this leads to a deeper and richer understanding and better use of knowledge. In addition, students, in order to motivate learning, should plan learning goals and monitor the learning process (Dolmans et al. 2005). Active listening also involves noting problems of understanding for questioning at an appropriate opportunity (Long & Lock 2008).

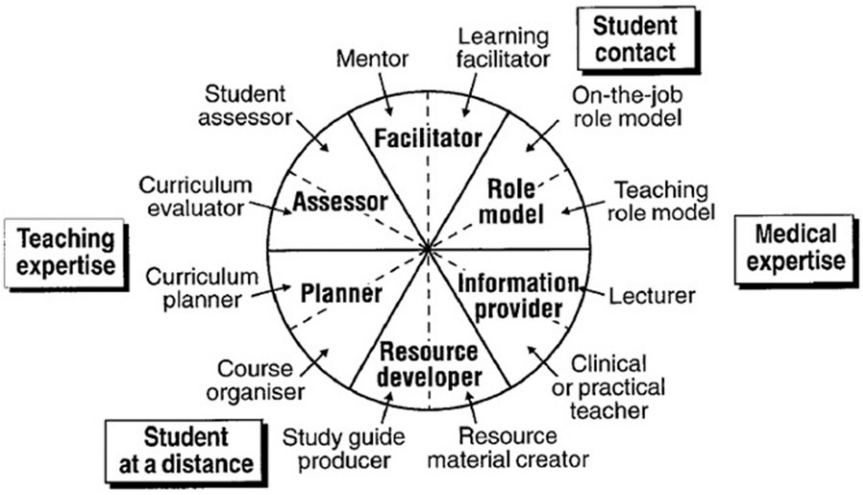

Figure 4. The 12 roles of the teacher.

1.2 The clinical or practical student: the reflective learner

It is by interacting with the physical world and with other people, both in the hospital and in the community, with his teachers, patients and with healthy people, that the student will discover concepts and apply skills. The student can then reflect upon his discoveries, which is essential for the student as a cognitive apprentice. Apprenticeship takes place when students observe and apply the thinking processes used by practitioners. Students also become teachers themselves by integrating what they have learned, i.e. by being reflective learners (Redmond 2006). They become thereby producers of knowledge, capable of making significant contributions to the world's knowledge.

2 The role model

2.1 The student as an on-the-job role model

Throughout his studies, the medical student's personality continues to be built through interactions with colleagues – either about lessons or personal subjects. These interactions are carried out between people of the same age who share the same habits. Furthermore, medical students interact with some patients in the hospital. Hence, a natural outcome is that the student will act as on-the-job role model and 'inspirer' for co-students. A good medical student should be a responsible person fulfilling all duties in a proper way, while combining theory and practice. He should 'build' a relationship of trust with patients, while focusing on the principles of medical professionalism. By creating high expectations and modelling behaviour, all these situations and opportunities enable the medical student to motivate and increase his colleagues' self-confidence and self-awareness (McKimm & Swanwick 2007).

2.2 The student as an in-the-classroom role model: The learning role model

The teacher's contribution to class function is important, but the student's participation is indisputably catalytic. The student is the one who by interacting with the teacher approves or rejects the teaching model initially introduced. This occurs not only by succeeding or failing the examination part of the learning process, but also by means of the overall attitude and behaviour during teaching hours.

Despite the fact that the teacher appears to be the master of the learning procedure, the student's corresponding role is the one that makes the student the creator of the learning model. The medical student should not be afraid of the 'power' of teachers and should strive to have all his questions answered, with a view to promote his own deep knowledge and understanding. In other words, the student works as an influence and guide for the teacher to pursue particular learning objectives (McKimm and Swanwick 2007), which will provide the students' community with basic supplements.

2.3 Choosing role models

The environment in which the medical student moves has an impact on how he perceives both himself and the others. The student should decide what or who represents best his perception and values by choosing his role models. Some teachers are excellent in their specialty, friendly and willing to help students. There are also some teachers who don't behave kindly towards patients nor students. Considering both personality types, the student has to learn to imitate the first model in his job and in his life and to avoid behaviours observed in the second model. This choice could also be made under the principles of medical professionalism, which will help the medical student decide whether a person is a suitable role model. The ability to choose role models should be developed in all responsible medical students who want to become tomorrow's responsible doctors and medical teachers.

3 The facilitator

3.1 The teaching facilitator

The move towards a more student-centred view of teaching and learning has required a change in the roles of both teacher and students. This change has brought about new

responsibilities for the student. The student should not be like an 'empty box' passively receiving the information from the teacher. The student should on the contrary take the role of teacher's facilitator. This implies active participation in the learning process: the student is not only a listener, he is also ready to react. This role is reflected in the constructivist approach to learning, in which knowledge is 'constructed' in the student's mind and constantly evolving (Brooks & Brooks 1993). When the student says to the teacher 'I understand such and such: is this what you are trying to teach me?' he becomes automatically a facilitator for the teacher, indicating what and how and how much and when to teach. For example, the student should lead the teacher to the point, which he believes is most important for his progress. It is easy for a student to express how helpful or useless a process is to him during the educational procedure. The student can discuss any of his queries with the teacher and all students should be encouraged to ask questions. It is clear that the student should have the intention to learn and this can be achieved by becoming teaching facilitator.

3.2 The mentee: the teacher's mentor

Everyone has a mentor or is beginning to want one (Morton-Cooper Palmer 2000), but the role of the mentor is often misunderstood or ambiguous. Mentoring is an 'off-line help by one person to another in making a significant transition of knowledge, work or thinking' (Megginson Clutterbuck 1995); 'by one person to another', by the teacher to the student of course, but by the student to the teacher as well, if a significant 'transition' is the point. It is about helping a person to learn within a supportive relationship (Harden & Crosby 2000), but also about helping a person to teach within the same supportive relationship, i.e. a special relationship that develops between two persons with the mentor always there for support, not dependency (Ronan 1997); this can (and should) work both ways: the student can be the mentor of the teacher, as the student can give the teacher the urge and motivation to continue working with more interest and enthusiasm. An actively participating student can inspire a teacher, whereas an incurious, uninvolved or absent student can create a depressing environment and dishearten the teacher. Crucially, mentoring does work both ways in the teaching and learning process. This being the case, the student-to-student mentoring relationship should by no means be overlooked either.

4 The assessor

4.1 The teacher's assessor

Assessment has emerged as a distinct area of activity for the medical student and one that should be given more attention in the curriculum. It offers perhaps the greatest challenges facing medical education today (Harden & Crosby 2000). Teachers' evaluation does represent another discrete role for the student. The student, apart from his other roles, should also have the role of the teacher's assessor. Teachers' assessment should start by the students (Berk 2006). It is the student's responsibility to assess his every single teacher. Students receive during their studentship around 50–60 summative marks by 50–60 teachers; in return, students should give back 50–60 marks to their 50–60 teachers. Students need assessments in order to progress; exactly the same applies to teachers. This role is an important one, as every student should assess in a valid, reliable, open, fair, and congruent way whether the teacher delivers his course in line with the course's objectives and outcomes – exactly in the same way that the teacher has to assess whether these are attained by the student or not.

4.2 The curriculum evaluator

The student has the responsibility not only to assess the teacher, but also to evaluate the course and curriculum delivered. Monitoring and evaluating the effectiveness of courses and curricula is now recognized as an integral part of the educational process (Harden & Crosby 2000; Berk 2006). Curriculum evaluation has been defined as 'a deliberate act of enquiry which sets out with an intention of allowing people concerned with an educational event to make rigorous, informed judgements and decisions about it, so that appropriate development may be facilitated' (Coles & Grant 1985), and students should by no means be omitted from being evaluators; they also should play this role with the same responsibility as when evaluating their teachers*.

*Two more properties of the good student – assessor could be considered: it is important for the student to self-evaluate his learning skills, as this is a great opportunity to detect his strengths and weaknesses and be provided with a further insight of the teaching and learning process. In addition, good self-assessment properties could be the best condition for the student to fulfill another role, that of student-to-student peer-assessment.

5 The planner

5.1 The keeping-up with the curriculum: Being curriculum co-planners

The role of keeping-up with the curriculum is one of the most challenging roles, as it requires a lot of time and effort on the part of the student. The student should be aware that the curriculum of a medical school is very demanding, as it concerns both the lectures and the practice in laboratories and hospital and the society. It is commonly known that a medical student should study hard all the time, because the medical curriculum consists of difficult courses. Thus, keeping-up with the curriculum, without violating the student's personal and social life, is crucial in medical education. Sometimes, or usually, if not always, teachers tend to overload the curriculum; students should then sound the alarm bells, becoming thus curriculum co-planners. Providing medical education is providing a service. Quality is said to be in the eyes of the beholder, which means that the consumer i.e. the student should be the judge of quality. Although their expectations and perceptions of quality change as students progress and as they grow in experience and confidence, they remain good judges of what they want and need to know. As a result, by being members of faculty boards for example, students have a unique role to play in determining the quality standards of medical education they receive (Sallis 2002).

5.2 The keeping-up with the course: The active participator

The best curriculum in the world will be ineffective if the courses that comprise it bear little or no relationship to the curriculum in place (Harden & Crosby 2000). The course organization is traditionally made by the teacher. However, in line with the recent move to a more student-centred process, this rule should be changed: the student should also be responsible for course planning. Students in medical education are adults and treating them as such involves shared responsibilities and student participation in the educational organization. For example, students could participate in regular evaluations of programme units, examinations, staff in their teaching role, or even of other students (Visser et al. 1998). After all, the student is the one who should and will learn; and, although anybody can be forced to teach, nobody can be forced to learn; learning is an inner process and the learner should therefore co-shape the courses. The student should not only be physically present in the lecture, he should also participate actively. In that way, he is able to lead the course along the pathway he wants by his questions, notes and observations. Moreover, students do not consider all subjects to be equally relevant (Tseretopoulou et al. 2011), and this perceived importance might not coincide with the curriculum or curriculum timetabling. Discordance might reduce student enthusiasm, confound student assessment of their teachers, and increase the discrepancy between the written and the hidden curriculum, i.e. the expected and the observed (real) curriculum. Finally, students should take every opportunity to voice their opinion and ideas, as close student participation in the educational organization encourages students to experience a certain level of control over their own education (Visser et al. 1998).

6 The resource consumer

6.1 The resource material exploiter / consumer

If the teacher is the creator of learning material (lecture notes, books, workshops, videos, patient selection, assessment and self-assessment tests etc.), the student is the consumer, expected to be a 'rational consumer' i.e. capable of finding 'the best value for money' from the material offered. Once upon a time, the only knowledge resource available was the master and the only resource material available to the apprentice were the master's patients; the student should (and could) consume everything offered. Medical schools then became more organized, with a variety of resources available within each school; the student gradually became unable to consume everything. Nowadays the Internet virtual reality tends to become a super-school or even a meta-school, the world medical school (e.g. IVIMEDS 2005); the student can't and shouldn't either consume everything, it is simply impossible. Today's medical student main challenge is what *not* to consume in order to consume the best within his own time-limitations, i.e. 'to learn how to learn', not taking for granted the resource materials given either within or outside each individual medical school (evidence-based learning).

The importance of undergraduate students searching a wide range of information sources is now recognized and even included as a specific learning outcome in some undergraduate curricula (Simpson et al. 2002; Stark et al. 2005; Cumming & Ross 2008). Moreover, deep learners have more intrinsic motivations and seek for more analysed understanding, rather than learning just enough to pass the exam. There is, therefore, a need to determine the information search and evaluation behaviour of students. Since the variability in quality of retrieved documents increases every day (especially from the Internet, where 'garbage in garbage out' applies), it becomes even more important that students acquire the ability to evaluate the quality of information, in order to be able to use proper information for their independent learning and for their future medical practice (Shanahan 2009). This can be achieved not only through assisted-training of the student by the teacher – and vice versa as the student tells the teacher what he has read – but also through self-training, thus developing the student's ability to distinguish and choose what is really useful.

6.2 The study guide user

A study guide serve as the student's personal tutor available 24 hours a day and designed to assist the student with his learning (Harden & Crosby 2000); at least of the level of the FAQ (frequently asked questions) included in good websites of today. It should be clear to students from the beginning what they should learn (expected learning outcomes), how they could learn it (available learning opportunities), and how they will know they have learned it (outcome self-assessment process): where to go, how to get there, and how to know you've been there (and not got lost). In this Internet era with a plethora of free e-resources, information pollution and increased student mobility, the risk of getting lost is real: the need for a resource material navigator is more than obvious. Many schools have not produced study guides at all; it is students' right and duty to demand them. And in schools where study guides are in use, it is the students' feedback that will enhance their quality and effectiveness: students become study guide co-creators.

Conclusions

The educational process has changed its focus towards becoming student-centred. This in turn has led the student to develop responsibilities in achieving the goals of teaching and learning: the 12+1 roles of the student were born. These complementary roles mirror the 12 roles of the teacher proposed by Harden and Crosby (2000) and are at least as important for the medical educational process. Furthermore, these roles determine the fields of student's appositeness in medical education. While each of the 12+1 roles has been described separately, in reality they are closely related and interconnected. Consideration of these important roles of the students should be part of the culture of the good learning practice.

As a good listener, the student can help the teacher to share information effectively. As a role model, the student can help both the teacher (to give a successful lecture) and co-students (as an example of how they should be). As a facilitator, the

student can participate effectively in the lecture and guide the teacher to understand which points require more explanations. As the assessor, the student can be the teacher's right hand, encouraging and leading him. As the planner, the student can help the teacher understand the student's curriculum perspective, thereby reshaping medical studies to involve less stress and more joy in useful and interesting learning and practice. Finally, in this new era of medical metaschools, the role of the student as evidence-based-learning (EBL) resource consumer is increasingly important, requiring teachers to act and adjust accordingly.

In conclusion, the described intertwined learning roles framework of both the teacher and the student reflects today's complexities of learning in universities and medical schools and provides a tool that will hopefully help to broaden our understanding of teaching and learning.

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Authors' contribution

Ioannis D. K. Dimoliatis conceived the idea and organized the study. All other authors worked through all stages as a group, carried out literature searching, had many group discussions, and wrote the first draft. All authors involved in successive drafting have read and approved the final manuscript.

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References

Berk RA. 2006. Thirteen strategies to measure college teaching. Virginia, USA: Stylus publishing LLC, Sterling. pp 188–199.

Brooks JG, Brooks MG. 1993. In search of understanding: The case for constructivist classrooms. Alexandra VA: Association for Supervision and Curriculum Development.

Camus A. "Some people talk in their sleep. Lecturers talk while other people sleep." as an epigram at: Long A., Lock B. 2008. *Lectures and large groups*, *ASME*, Lecturing & Listening, Understanding Medical Education Series, pp 1–28.

Coles CR, Grant JG. 1985. Curriculum evaluation in medical and healthcare education, ASME Medical Research Booklet No.1. Med Educ 19:405–422.

Cumming, AD, Ross, MT. 2008. The Tuning Project (Medicine) – learning outcomes/ competences for undergraduate medical education in Europe, Edinburgh: The University of Edinburgh. Available from www.tuning-medicine.com

Dolmans DHJM, De Grave W, Wolfhagen IHAP, Van Der Vleuten CPM. 2005. Problem-based learning: Future challenges for education practice and research. Med Educ 39:732–741.

GMC 2009. Tomorrow's doctors. London: General Medical Council. [Accessed 30 July 2010] Available from http://www.gmc-uk.org/static/documents/content/TomorrowsDoctors_2009.pdf

Harden RM, Crosby J. 2000. AMEE Guide No 20: The good teacher is more than a lecturer – the twelve roles of the teacher. Med Teach 22(4):334–347.

IVIMEDS 2005. *The international virtual medical school*, Dundee: Delivering e-learning in medical education. [Accessed 30 July 2010] Available from www.ivimeds.org

Long, A, Lock, B. 2008. *Lectures and large groups*, *ASME*, Lecturing & Listening, Understanding Medical Education Series, pp 5-6.

Mclean M, Gibbs T. 2010. Twelve tips to designing and implementing a learner-centred curriculum: Prevention is better than cure. Med Teach 32(3):225–230.

Mckimm, J, Swanwick, T. 2007. *Educational leadership*, *ASME*, Understanding Medical Education Series, pp 2–11.

Megginson D, Clutterbuck D. 1995. Mentoring in action, A practical guide for managers. London: Kogan Page.

Morton-Cooper A, Palmer A. 2000. Mentoring, preceptorship and clinical supervision – a guide to professional roles in clinical practice. 2nd ed. Oxford: Blackwell Science.

Redmond B. 2006. *Reflection in action: Developing reflective practice in health and social services* (Ashgate), Farnham, Surrey, UK.

Ronan NJ. 1997. Mentoring the distance learner. Open Learning 12(3):62–67.

Sallis E. 2002. Total quality management in education. 3rd ed. London: Kogan Page.

Shanahan M. 2009. Learning centred approach for developing the electronic information search processes of students. Med Teach 31:994–1000.

Simpson JG, Furnace J, Crosby J, Cumming AD, Evans PA, Friedman Ben David M, Harden RM, Lloyd D, McKenzie H, McLachlan H, McLachlan JC, McPhate GF, Percy-Robb IW, Macpherson SG. 2002. The Scottish doctor–learning outcomes for the medical undergraduate in Scotland: A foundation for competent and reflective practitioners. Medical Teacher 24(2):136–143.

Stark DrP, Ellershaw J, Neblew D, Perry M, Robinson L, Smith J, Whittle S, Murdoch-Eaton D. 2005. Stude nt-selected components in the undergraduate medical curriculum: A multi-institutional concensus on assessable key tasks. Medical Teacher 27(8):720–725.

Tseretopoulou, X., Stratou, A., Stavrinou, P., Souretis, G., Dimoliatis, IDK. 2011. Students do not consider all subjects to be equally relevant – a method quantifying relevance; implications for curriculum timetabling, teaching & learning, and student assessment of teachers, *Arch Hellenic Med*, 28(2): 227–233 (in English, free full text available http://www.mednet.gr/archives/2011-2/227abs.html)

Visser K, Prince KJAH, Scherpbier AJJA, Van Der Vleuten CPM, Maarten Verwinjnen GM. 1998. Student participation in educational management and organization. Med Teach 20(5):451–454.

Zaat JO, De Leeuw PW, Verheugt FW. 2008. Two-thirds of doctors are female, but ever still behind [Article in Dutch]. Ned Tijdschr Geneeskd 152(40):2153–2154.