Whose difficulty is it?

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As a preceptor for medical trainees, I often question the validity of the term *learner in difficulty* for a struggling individual. Knowing that teaching and learning are mutually interactive processes, I try to consider other possible confounders of the learning process before tagging a student with the learner-in-difficulty label. I have found using a matrix approach consisting of 3 players interacting with 3 main ingredients extremely helpful when seeking appropriate remedies for any difficult teaching-learning situation.

The 3 players

Preceptors. Preceptors are teachers who impart knowledge and skills to apprentices. Their individual objectives are influenced by their own life experiences. Their competence is determined not only by their actual knowledge and skills but also by their style of teaching. In reality, preceptors can only teach within the constraints of the system, drawing on available resources for optimal outcomes. Good preceptors evaluate themselves on how effectively they taught as vigorously as they evaluate how effectively the students learned. Nevertheless, there is no "natural-born" teacher, and one cannot assume that all preceptors know how to deliver knowledge or skills constructively and effectively. Preceptors lacking experience might either be too rigid in their style, or unable to recognize the weaknesses of the learners and inspire them to attain goals within their capabilities. I have also witnessed personality conflicts arising between preceptors and learners, and the ultimate onus should rest with the preceptors in having the experience and knowledge to resolve the situation.

Learners. Learners are apprentices who receive knowledge and skills from teachers, with a learning capacity defined by their education and their own personalities. In my experience, younger learners are more likely to conform to both the teacher's format and the teacher's style of delivery and are more easily molded, so to speak, by their teachers during preceptorship. Mature learners are often less pliable, as they have values and norms from previous experience, which tend to filter or colour any new information they receive. To complete the learning process, the apprentices are often evaluated against defined benchmarks to gauge their performance. Subject to constraints of the system and availability of resources, learners who have not met defined expectations need intervention and to be re-assessed.

Here is the snag: as for driving lessons, basic knowledge and experience can be acquired to pass the driving test, but thereafter, the driver's road competence will continue to evolve with subsequent exposure and environmental variables. Aristotle called it *phronesis*, or practical wisdom.[1] New graduates from different medical schools might not differ much in their knowledge and skill sets, yet subsequent exposure to different clinical settings will diversify their individual phronesis. In a reverse scenario, international medical graduates intending to practise in Canada are inevitably more diverse in terms of phronesis. This poses immense challenges for our medical licensing bodies in assessment and evaluation. It is not uncommon for international medical graduates who have been practising competently in their previous locations to be rated as insufficient in the Canadian system, and they often perform less competitively in board examinations when compared with their Canadian cohorts.[2]

System. System comprises the administrative, executive, and financial frameworks at various levels that bring together the teacher, apprentice, and materials for teaching and learning. In real life, this system is often constrained by finite resources including time, space, facilities, and finances. One should never take for granted that the system must be optimized for teaching and learning in an educational institute. Often, it is not optimized. Inflexible allocation of time or space, poor mentoring facilities, and suboptimal mentoring environment[3] can all compromise the efficiency of learning and teaching (**Table 1**).

The 3 ingredients

Hardware. Implicit in the process of learning are measurable outcomes that often equate with some knowledge to be acquired or skills to be attained. As a preceptor, I see these measurable outcomes as deliverable hardware. From the learner's perspective, they are items to be retained and reproduced in written format or simulated settings like the objective structured clinical examination. Most licensing examinations in Canada evaluate learners on 2 accounts: the Medical Council of Canada Qualifying Examination has both written and objective structured clinical examination components, whereas the Certification Examination in Family Medicine conducted by the College of Family Physicians of Canada has both a written module and simulated office orals. Such hardware, as I call it in the process of teaching and learning, is inevitably modified by geographic domains and paradigm shifts. For example, the knowledge and skills for performing a Papanicolaou smear are mandatory for every family medicine trainee in Canada. However, such hardware would not be essential in mainland China, where 99% of Pap smears are performed by gynecologists. When I worked as

a houseman in England in the 1980s, I religiously followed the ABC mnemonic (airway, breathing, circulation) for external cardiopulmonary resuscitation; starting in 2010, the paradigm is now CAB (circulation, airway, breathing).[4]

Software. Imagine you have to deliver objects from one end of a long table to a person at the other end. There are a number of ways to do it: carry them over all at once or one by one; slide them across the table or throw them in the air hoping the person can catch; wrap them up in a box or just send them over without one; etc. Each method of delivery involves a different mind-set from the sender (preceptor) and the recipient (learner) regarding how well-packaged the goods (knowledge and skills) should be and how far the delivery (teaching) should go. Obviously there are no absolutes in these processes; their variations and modifiability are the characteristics of the software of the system. The software can be continuously rewritten until the goods are delivered safe and sound.

Dynamics. This term embraces interactions among all the variables that set teaching and learning in motion. These variables can be observed from different perspectives (ie, teacher, learner, and system) and are often evaluated in terms of efficacies and consistencies. If hardware is about what has been taught and learned, and software is about how the students have been taught and how they learned, then dynamics are about why it has worked or not worked. Not surprisingly, dynamics are the most crucial yet vulnerable variable, and often render the overall outcome of teaching and learning unsuccessful despite the presence of all the right players and ingredients.

Putting it together

When approaching a difficult learning-teaching scenario, I strive to begin with an objective and nonjudgmental mind-set. To implement the outlined approach, I involve the relevant players and facilitate a vigorous analysis using the matrix approach (**Table 1**) to identify problems and implement changes, preferably aided by a third party from the academic office. Missing ingredients like gaps in knowledge and skills, and lack of teaching facilities, assessment tools, and supportive staff, can easily be supplemented; however, problems like attitude issues are more challenging to address and resolve. Finally, I would attempt to foster a well-structured system for giving and receiving feedback and "feedforward" to enable optimal interaction of all the matrix variables with a common goal of improvement. *Feedforward* is a process of communication in which pre-feedback (usually a written document) is given to someone from whom you are expecting feedback.

In any problematic teaching-learning process, the difficulties might rest with the learners, but this is not always the case. Medical educators and preceptors should conscientiously evaluate the process from all perspectives, using the suggested 3-by-3 matrix to arrive at the best solution.

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Competing interests
None declared

References

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Table 1. What can go wrong in the teaching-learning process: *The 3×3 matrix concept.*

	PLAYERS		
INGREDIENTS	PRECEPTOR	LEARNER	SYSTEM
Hardware	• Lack of clinical knowledge or skills • Outdated or non–evidence-based knowledge or skills • Lack of computer proficiency • Biased scope of knowledge	• Lack of work experience • Uneven portfolio of knowledge or skills • Biased by previous work experience • Lack of computer proficiency	• Lack of funding or resources for teaching • Inadequate administrative or executive personnel to run program • Inadequate facilities or amenities
Software	• Overconfidence • Parental attitude or arrogance • Unrealistic expectations • Unable or unwilling to perceive the learner's perspective • Low tolerance for error • Low incentive or priority	• Over-diffidence or inferiority complex • Antagonistic mentality • Lack of insight into personal strengths vs weaknesses • Unwilling to accept comments • Low tolerance for failure • Excess motivation to achieve	• Lack of feedback opportunities • Poor assessment tools • Lack of mentorship system
Dynamics	• Language barrier • Inefficient teaching methods • Personality incompatibility • Lack of peer review	• Language barrier • Personality incompatibility • Ethnic or cultural constraints or dilemmas	• Redundancy or duplication of workflow • Challenges in arranging meetings • Unclear guidelines for feedback and assessment • Lack of counseling or briefing time • Lack of social contact time