

## Producing Competent Doctors – The Art and Science of Teaching Clinical Skills

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For a doctor to provide medical care with competence, he must not only have knowledge but must also be able to translate that knowledge into action. It is his competence in clinical skills that will enable him to practice safely and effectively in the real world. To ensure acquisition of clinical skills, medical teachers must adopt teaching methods that prioritise observation, practice, feedback; and more practice. We try to elucidate the meaning of clinical skills, the challenges inherent in clinical skills training in India, training models that have shown success in practice and can be adopted in the Indian context, and various techniques to enhance skill-training, including the giving of feedback, which is a critically important component of skills development.

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*“To know what has to be done, then do it, comprises the whole philosophy of practical life.” - Sir William Osler*

**W**hen medical graduates enter the frantic and challenging clinical arena, they are called upon to apply themselves immediately to the direct care of patients.

For a doctor to provide a high level of clinical care, a judicious mix of knowledge and skill is required with skills being built on the bedrock of knowledge. Miller’s pyramid of clinical competence reinforces this concept – the broadest part of the pyramid is ‘Knows’ followed by ‘Knows how’ [1]. Both of these represent the cognitive domain, upon which are built ‘Shows how’ and ‘Does’. Though the narrowest part is ‘Does’, it is at this stage of competence that the learner actually performs as a doctor by applying in practice all that he has learned. With the current systems in place, while knowledge is usually gained, skill acquisition is not invariably assured [2]. Medical educators must adopt appropriate teaching-learning methods to produce skilled doctors – doctors with the ability to perform, to ‘do’.

### WHAT ARE SKILLS?

Taken literally, a skill is an ability that is acquired through deliberate, systematic, and sustained effort; thus, training is required before a person can be said to be skilful. Conventionally, when used in the context of KSA – Knowledge, Skills, Attitude – the term ‘skill’ refers to psychomotor skills which are manual, physical skills such

as staining a hematology slide, performing urinary catheterization, suturing a laceration, or drawing a blood sample. With training, psychomotor skills progress all the way from the learner observing an expert performing the skill, to the learner mastering the skill. The progression is commonly defined using a simplification of Dave’s taxonomy that starts with imitation, moves to control, and ends with automatism [3]. An example of imitation would be when the learner observes a trained person draw a blood sample and copies her; with practice under supervision, the learner gains some control over sampling until, finally, she is able to do it automatically and can even adapt it to cover problem situations like an uncooperative child or a patient in shock.

Over the years, the term ‘skill’ has taken on a broader definition that includes not only the ability to effectively draw a blood sample, but also other aspects like the ability to interact with the patient, obtain consent, and handle complications [4]. Both the Medical Council of India (MCI) and the Association of American Medical Colleges (AAMC) mention the need for skill development during undergraduate medical education; the latter defines a clinical skill as a discrete, observable task during the provision of care [5,6]. From that standpoint, clinical skills could include everything from establishing a professional relationship with the patient, to taking a clinical history, performing an appropriate examination, recommending and performing diagnostic tests, and undertaking therapeutic interventions.

These discrete and observable acts are reflected in some of the competencies identified by both the MCI and the Accreditation Council for Graduate Medical Education (ACGME); thus, 'Clinician' and 'Communicator' roles of an Indian Medical Graduate, and the 'Patient Care' core competency of the ACGME are essentially related to clinical skill development [5,7].

### **Types of Clinical Skills**

Besides basic, generic clinical skills, there are problem-based clinical skills, discipline-specific clinical skills, and continuum-of-care skills [6].

- *Basic clinical skills:* These are needed regardless of discipline and setting. They include communication skills (building the patient-doctor relationship, taking the history, counseling, reflecting with and teaching the patient); examination skills (of the anatomy and function of body organs); and clinical investigating and procedural skills (for basic diagnosis and therapy).
- *Problem-based clinical skills:* These assist in case-based learning and can be learned and practised through evaluating commonly seen problems like fever, and cough.
- *Discipline-specific clinical skills:* These skills are specific to a particular discipline *e.g.*, aseptic

technique can be repeatedly practiced during a surgical posting while preventive health skills can be learned during community visits.

- *Continuum-of-care skills:* These include those learned while students rotate through different clinical settings like the outpatient, inpatient, emergency, intensive care, and community settings so that they are exposed to the continuum of care across settings.

### **Levels of Clinical Skills/Competence**

There are various instruments and scales that guide learners and trainers on the path to acquisition of clinical skills or competency [8-10]. **Table I** details Dreyfus' skill levels. Individual specialties can define standards applicable to different stages of training, as detailed previously [11].

### **TEACHING OF CLINICAL SKILLS**

#### **The Challenges**

Once the need for training in clinical skills has been established, the next logical step is to determine effective methods so that learners can be trained to perform the skills safely and effectively; however, before that, one must understand the challenges inherent in the clinical learning environment [12,13].

Invariably, there are time constraints owing to

**TABLE I** AN EXAMPLE OF LEVELS OF ACQUISITION OF CLINICAL SKILLS ACCORDING TO THE DREYFUS MODEL

<i>Dreyfus' skill Level</i>	<i>Description*</i>	<i>Example</i>
Novice	Learner has minimal knowledge and needs close supervision; he tends to stick to rules or follow the plan since he lacks the confidence to innovate.	Is only able to perform endotracheal intubation if full supervision is provided
Advanced Beginner	Through practice, learner is able to perform simple tasks to an acceptable standard, needing only occasional supervision.	Can perform intubation with only occasional supervision.
Competent	Learner demonstrates coordination and efficiency in standardised and routine procedures, and can assess and plan for complicated situations.	Performs intubation with ease, unsupervised, and 'knows how' to plan for complicated situations
Proficient	With a deeper understanding of the theoretical and practical aspects of the skill, the learner becomes proficient in it, taking full responsibility and dealing with complicated situations routinely.	Performs intubation with ease in complicated situations like a patient with a deformity of the cervical spine
Expert <sup>#</sup>	The learner has authoritative knowledge, intuitively innovates, and trains others in the skill.	Innovates and trains others in the technique of endotracheal intubation

\*Based on Dreyfus [9] and Benner [10]; #Progression occurs as a gradual transition and does not stop once 'expert' level is achieved; on the contrary, experts must periodically evaluate themselves and seek opportunities to stay up-to-date.

patient-care, research or administrative responsibilities preventing active participation in teaching by clinical teachers; patient priorities must often take precedence over teaching; opportunistic teaching may result in unpredictability and can sabotage learning objectives; expectations from learners may be mismatched especially when there are multiple hierarchies in the same clinic (different semesters of undergraduate students together, or undergraduate along with postgraduate students); patient unwilling to allow teaching encounter or too sick; limited time for immediate feedback or student self-reflection; shorter in-patient stay precludes learning natural history of a disease from in-patient follow up; multiple patient problems may prevent teaching one problem in detail; awkwardness in pointing out student's errors, or admitting to consultant's errors, in front of the health team.

### **Models of Clinical Skills Training**

We describe some models that are already being used in a limited sense or can easily be adapted to the Indian context.

#### **See One, Do One, Teach One**

SODOTO, as it is popularly referred to, is a method of learning procedural skills that dates back several generations [14]. Learners observe an expert perform a procedure, then perform it themselves, and, after practice, they train others to perform it. In this apprenticeship model of medicine, learners learn by practising on real patients, which is the most realistic way to learn. The main disadvantage is that this approach is poorly structured and may fail to teach the skill properly; for the same reason, assessment may be difficult. Since it is usually performed on real patients, often without adequate supervision, patients may be exposed to harm at the hands of learners who, as yet, lack experience and technical skills.

One way to overcome these disadvantages is to prepare learners beforehand; thus, learners should read about the steps of the procedure, observe experts perform it, watch video demonstrations, practice on manikins, and only when they feel confident should they perform the procedure on a patient. A clinical skills laboratory can help achieve clinical skills training without exposing the patient to trial and error.

#### **Peyton's Four-step Approach [15]**

Skills are learned through practice under the observation of the trainer who provides feedback. There are four steps:

1. *Demonstration*: The trainer performs the task as usual

– say an endotracheal intubation - demonstrating it to the learner without any comments while the learner observes the procedure.

2. *Deconstruction*: The trainer repeats the procedure, but this time he demonstrates the equipment and details each step of the procedure.
3. *Comprehension*: The learner takes over at this stage, explaining each step of the procedure while the trainer performs it according to the instructions of the learner.
4. *Performance*: The learner performs the complete procedure by himself.

The learning session is structured as follows [16]:

- *The set* – Where the teacher takes into consideration the learners' basic knowledge; the learner's position (learner watching from the side or from across); and ensures that the learner can clearly see all the steps.
- *The dialogue* - The teacher breaks up the procedure into clear steps; provides positive feedback and corrects mistakes; keeps dialogue focussed to the task at hand; and considers another session if the task is complex and requires long explanations.
- *The closure* – Here the teacher evaluates that the learner will be able to perform; and explains how the procedure may have to be adapted under different circumstances.

In practice, the demonstration (step 1) could be done on a real patient so that the learner witnesses a real-life, competent performance, while deconstruction and comprehension (steps 2 and 3) can be performed away from the patient using only the relevant equipment. The steps should be repeated in different situations so that the learner can perform satisfactorily in different scenarios.

Peyton's four-step approach helps learners, who start off as "consciously incompetent", become "consciously competent"; thus, from realising that they cannot perform the skill, they begin to be able to perform with conscious thought. Further, learners are actively exposed to professionalism and patient-doctor communication during step 1 which is not usually the case during conventional training [17]. Step 3 is considered the most relevant for learning the skill since it includes mental representation and vocalisation of the skill. One disadvantage of this approach is that it is meant for a one-on-one teacher student interaction; unfortunately, such an ideal teacher-student ratio is not the norm and this technique may not be applicable to small group teaching. Educators have attempted to overcome this disadvantage by sharing videos of steps 1 and 2 with large groups and

having small batches perform steps 3 and 4 [16]. Alternatively, the teacher can demonstrate steps 1 and 2 to the entire class. This is followed by step 3 with a single learner (learner 1) while the other learners are observing the skill. Learner 1 then takes the place of the teacher and performs step 3 under the instructions of learner 2 and so on until every learner has completed step 3 and moved on to step 4 - all the while getting feedback from a peer as well as from the teacher [17].

### **Talk the Talk and Walk the Walk** [18]

This literally means that trainers should practice what they preach *i.e.* become positive role models, especially for training in communication, reasoning, empathy and other essential patient-centered clinical skills.

**T= Think out loud:** To demonstrate clinical reasoning, the trainer should vocalise his thoughts as he works towards a differential diagnosis or chooses a particular line of treatment. The learner is exposed to the process and not merely to the outcome of clinical reasoning.

**A= Activate the learner:** Motivate the learner to engage with patients so as to provide patient-centered care; promote learner autonomy.

**L= Listen smart:** This is done so as to diagnose the learner's abilities in the clinical environment.

**K= Keep it simple:** Demonstrate focused communication and rule-based clinical decision making.

**W= Wear gloves:** Besides demonstrating the importance of universal precautions, its true utility lies in the promotion of a hands-on approach to patient care. The trainer role-models the physical examination and respectful, healing touch.

**A= Adapt enthusiastically:** Clinical medicine is fraught with uncertainty; the trainer should accept unexpected outcomes and admit mistakes with humility, changing course when required.

**L= Link learning to caring:** Demonstrate empathy and caring for all patients and expect the learner to do the same.

**K= Kindle kindness:** Give and expect kindness routinely to demonstrate that the patient is not the enemy.

### **Other Techniques to Enhance Clinical Skills Training**

#### **Peer-assisted Learning** [19,20]

Peer-assisted learning is an educational method where students function as teachers as well as learners. The peer can be a fellow student (Student as teacher) or a resident (Resident as teacher) who works together with the learner

to construct new knowledge. It results in reciprocal learning with the peer and the student learning together. Peers are better accepted as teachers because they are closer in experience to the learners and thus are perceived as being friendly, supportive and less threatening than consultants. They understand the learning difficulties of their peers and are reported to give useful feedback, besides being enthusiastic to teach [21]. Peer teachers, being advanced beginners, are more likely to use a step-wise approach than consultants, who, over time, have developed an integrated approach to teaching skills.

Besides cognitive skills, peer-assisted learning facilitates lifelong learning, teamwork, critical thinking, reflection and communication. Peer teachers can close the gap between students and clinical teachers, and make small-group teaching possible in situations where clinical teachers are over-burdened by large patient loads and other responsibilities. Peer-teachers may derive academic and career benefits from their teaching experience. A disadvantage of using peer-teachers is that they have limited clinical expertise and may not be as competent as consultants in teaching the cognitive and technical aspects of complex procedures. Training in pedagogical principles is required before peers can be recruited for peer-assisted learning activities.

### **Clinical Skills Laboratories**

These are educational facilities that provide a protected environment for learners to practice clinical skills before using them in real settings. Repeated practice in a skills laboratory not only ensures that students acquire proper, safe techniques, but also helps them maintain a high level of skill. To achieve skill acquisition, it is important for institutions to create an authentic environment with multiple resources, to facilitate student motivation, and to provide opportunity for repeated practice [22]. Skills laboratories may use a mix of simulation-based learning using manikins, videos, computers or virtual reality, and standardized or simulated patients.

### **Simulation-based Learning**

Simulation in medical education means to use an artificial process to mimic a clinical encounter. Simulators are devices or tools that replace the actual patient and allow experiential learning through deliberate practice [23]. Experiential learning is an active process where the learner adds new knowledge and experience upon previous knowledge and experience, and thus constructs new learning. In simulation-based learning, the learner can make mistakes that do not impact a real patient [24]. **Table II** shows various ways in which simulation can be used in clinical skills training. Clinical semester students

**TABLE II** WAYS TO USE SIMULATION TO TRAIN STUDENTS IN PEDIATRICS

<i>Semester</i>	<i>Simulation Exercise</i>
Third and fourth	<i>Low to medium fidelity:</i> Normal and abnormal anatomy and physiology of a child; Anthropometry; use of basic equipment like the sphygmomanometer
Sixth and seventh	<i>Low to medium fidelity:</i> Pharmacological principles in the pediatric age group; <i>High-fidelity:</i> make a clinical diagnosis, elicit signs, perform and interpret investigations
Eighth and ninth	<i>High-fidelity:</i> Initiate treatment; observe the results of the treatment on the 'patient's' well-being; perform resuscitation

can practice increasingly complex skills in increasingly complex scenarios as they progress through training.

#### **Simulated Patients/Standardized Patients [25]**

A simulated patient (SiP) is an otherwise healthy actor who has been trained to display different clinical symptoms and signs. He participates in the history taking and the examination and communicates sufficiently well so that even an expert may be fooled into believing he is a patient. A standardized patient (SP), on the other hand, is usually a real patient who has the history and the clinical findings of a medical problem. He is tutored to depict a specific medical case for the specific purpose of training medical students. SPs display real feelings and emotions.

SiP and SP are useful in teaching communication skills for history taking, information gathering, for interpersonal communication, addressing sensitive issues, and counseling patients or breaking bad news [23]. They also help in improving examination skills and in honing patient feedback skills in a controlled way. The clinical scenarios can be matched to the level of training of the student and can be repeated for every student, allowing uniformity of the learning experience. SiP and SP need to be trained and compensated; their performance has to be monitored to ensure reliability and validity; an SP/SiP 'bank' should ideally be set up - thus, expertise and resources are required.

#### **ASSESSMENT OF CLINICAL SKILLS**

Assessment methods must lend themselves to the measurement of whether skills have been acquired and also how well they have been learned. Understandably, since a skill is an activity, it has to be observed. From the standpoint of Miller's pyramid of clinical competence [1], the student 'does' while the assessor observes. The

ideal place to observe a learner perform is at the workplace – Workplace Based Assessment (WPBA). Assessment at the workplace should be an ongoing process (formative assessment) with the learner being given immediate feedback and multiple opportunities to perform the activity until he becomes competent at it [11,26]. Directly-observed procedural skills (DOPS), mini-clinical evaluation exercise (mini-CEX), multisource feedback (MSF) and mini-peer assessment tool (mini-PAT) are some of the WPBA methods in use. Many of these have been discussed previously [11,27,28]. They have in common two critically important aspects – observations that are recorded on assessment checklists, and feedback.

Objective checklists are used to record what the learner 'does', although subjective assessments are made too. The inherent bias of a subjective assessment is reduced considerably through the use of multiple assessors over more than one occasion and in multiple settings [11]. For the learner to be said to have acquired competency in a particular skill, his checklist score should preferably match set criteria (criterion-based) rather than be normative-based; with the latter, he may not be truly competent in his own right but merely more competent than other learners.

Feedback is the key that promotes learner progression and improvement [13,27]. Direct observation of the learner's performance followed by immediate feedback helps him understand where to change practice so as to become competent. Medical teachers hesitate in giving feedback for a number of reasons, prime being that they don't want to hurt the learner's feelings, fear that he might take it negatively as a criticism of his actions, or worry that he may disrespect the feedback and advice given [29]; however, when given constructively, in a safe, mutually respectful environment, and especially when solicited by the learner in order to improve his performance, feedback is extremely useful (**Box I**). Effective formative feedback is an important component of assessment for learning and is more likely to lead to learning [13]. Work-place based feedback does not take too much of the clinician's time. When given as part of a regular, ongoing process, the learner begins to expect and desire feedback rather than feeling ambushed by it.

In conclusion, taking cognizance of the challenges to clinical skills training in our country, we can use many of the training models that have shown success in practice and adapt them to the Indian context.

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**Box I** GUIDELINES FOR GIVING AND RECEIVING FEEDBACK*Guidelines for giving feedback*

- Feedback should be given soon after the performance but away from the patient
- It should be content specific, reflecting on the current task only.
- Ask the learner to start with what went well. Stay positive.
- It should focus on behaviors that can be changed. The teacher could suggest alternative behaviors, but must do so sensitively. Example: 'I like the way you listened patiently to the history. Perhaps next time you could make more eye contact while the patient is talking. I feel she would have found it easier to trust you and would have opened up about the substance abuse much sooner. There's a good article on non-verbal communication that I think you should read.....'
- Questions should be framed such that they encourage reflection. How do you think the patient felt? What would you do differently next time?
- Negative feedback should be non-judgmental. It should be directed to the performance and not the learner's personality. Example, 'what you did was hurried' and not 'you are very impatient'.
- Feedback should be restricted to 2-3 key messages so as not to overload the learner and should correspond to the expected learning outcomes of the activity.
- Close by summarizing.

*Guidelines for receiving feedback*

- Ask for it
- Listen first, without becoming defensive
- Respond gratefully and gracefully, don't react
- Use the feedback to change behavior
- Ask for clarifications where required
- Ask for an opportunity to demonstrate changed behavior

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