Essentials of POSTGRADUATE PHARMACOLOGY & BIOSTATISTICS

Guidebook to Postgraduate Trainee in Pharmacology

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Competency-based Medical Education

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Section 2: New Undergraduate Medical Education Curriculum

Recent times have witnessed paradigm shift of medical education in India. Major change is inclusion of competency-based medical education (CBME) to prepare competent Indian Medical Graduate (IMG) with the national goal of Health for All. "Competency-based education has been defined as an outcome-based approach to the design, implementation, assessment, and evaluation of a medical education program using an organizing framework of competencies". It is an alternative to traditional time-based teaching method.

Key features of CBME are as follows:

- Driving force knowledge application but in traditional method, knowledge acquisition
- Learner-led process and designed to fit individual learning styles
- Easy access to variety of resources, in traditional method limited resource
- Participants knowledge and skills assessed as they enter the program but no such facility in traditional method
- Flexible timetable—self-paced learning (fixed time frame in traditional method)
- Emphasis on repeated formative assessment (summative in traditional teaching)
- Responsibility lies in both learner and teacher

- Integrated learning
- Interprofessional collaboration (encourages teamwork)
- Emphasis on attitude, ethics, and communication
- Skill-based learning

COMPETENCY-BASED CURRICULUM

National Medical Commission (NMC) has added framework of the essential competencies for an IMG. A broad framework has provided by the NMC and has permitted further modification at the college level for implementing the new curriculum. This flexibility is decided by "Curriculum Committee" at the college level consisting of few faculty members who are being trained under the Faculty Development plan. Though the total duration of the course is fixed, semester wise revision has been done. Broad competencies given by the NMC are to be divided into subcompetencies or specific learning objectives by each institute. Competencies recognize domains of learning (Bloom's taxonomy) and level of learning (Miller's pyramid). Domains are Knowledge, Psychomotor/Skill, Affective (attitude and communication) whereas levels include Know (K), Know how (KH), Show (S), Show How (SH), and Perform (P). Miller's prism combines both domain and level of learning. Competencies cover core area which is provided to the institute in Module I, Module II, and Module III. These areas *must* be learnt by the undergraduates. Noncore area (desirable) may be added by curriculum committee. Mode of delivery has been instructed by specific numbers of lectures, small group discussion (SGD), and self-directed learning (SDL). Time frame for each is also there. Allotment of fixed hours for SDL in every subject is a step toward increasing knowledge and as well as lifelong learner which is one of the most important roles of IMG. Assessment of learning is linked with learner, goals, and objectives. Different assessment tools have been pointed out. Other than these, nonacademic domain such human resources, management related to healthcare delivery, responsibility, and accountability have been focused.

Indian Medical Graduate is doctor of first contact of the community possessing requisite knowledge, skill, attitude, values, and responsiveness. This is the goal of medical education. Roles of an IMG (C2L2P) are given as follows **(Fig. 2.2.1)**:

- Clinician—provides promotive, curative, palliative, preventive, and holistic care
- Communicator—with patient, family members of patient, and community

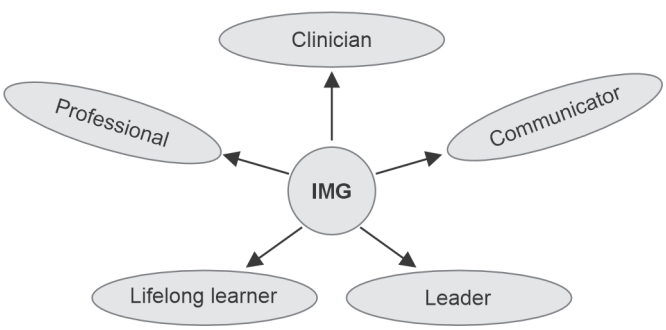


Fig. 2.2.1: Role of Indian Medical Graduate (IMG).

- Leader—works in healthcare team system
- Lifelong learner—committed to continuous improvement of skill and knowledge. SDL is important
- Professional—committed to excellence, ethical, responsive and accountable to patients, community, and profession

Integrated Teaching

When a student reaches in final year, he forgets most of the theoretical knowledge what he has learnt in previous years. Also, it is difficult to pay attention to individual student as number of seats have increased in recent times. Considering these along with the intention of improved outcome, integrated teaching at all levels is necessary. It can be done in two ways. One is horizontal integration where two or more *disciplines* of any phases of the curriculum are combined. Another one is vertical where two or more *phases* of the curriculum are combined. Different terms are used in this context—alignment and integration, sharing, nesting, and correlation. Advantages of integrated teaching are as follows:

- Improves learning outcome
- Saves time
- Proper utilization of resources
- Promotes interdepartmental collaboration
- Avoids repetition of same topic

Addition of Attitude, Ethics, and Communication as a New Subject

Inclusion of Attitude, Ethics, and Communication (AETCOM) module with the following objectives:

- To build communication skill with patients, their family, society as well as with colleagues
- Awareness of ethics in medical education
- Importance of values, beliefs, responsibility, and accountability in patient-physician bonding
- Sharing information in either direction is important
- Altruism is highly relevant

Foundation Course

Foundation course is started after entry into MBBS course with the objective of engaging in different activities to familiarize with the course, healthcare delivery system, and the surrounding environment. It is felt necessary also to overcome language barrier and adjusting dietary pattern. Now the learners are away from family members. Some anxiety about the curriculum also prevails within the students. We, the teachers and administrators, should be aware of these facts:

- Total duration 175 hours
- Organized by coordinator appointed by Dean of the college
- Supervision by Head of the preclinical departments

Structure of Foundation Course

Orientation module: Total hours: 30
Introduction to institution/campus/facilities, role of doctors in the society, history of medicine and alternate systems, IMG roles/overview MBBS curriculum various career pathways, and principles of family practice.

Skills module: Total hours: 35
First aid, BLS, Universal precautions, Waste management, Immunization.

Community orientation module: Total hours: 8
National health goals and policies/healthcare systems/community health/interactions with patients and families, and communities.

Professional development and ethics module (P&E): Total hours: 40

Concept of professionalism and ethics, white coat ceremony, professional behavior and altruistic behavior, working in a healthcare team, disability competencies, cultural competence, stress management, time management, and interpersonal relationship learning.

Enhancement of language and computer skills module: total hours: 40

Communication, local and English language training, and computer skills training

Sports and extracurricular activities: Total hours: 22

Sports—mandatory 4 hours per week
Extracurricular activities 2 hours per week, subject to a total of 22 hours

Elective Posting

"An elective is a learning experience created in the curriculum to provide an opportunity for the learner to explore, discover, and experience areas or streams of interest".

"Block is a defined time period during which learning experiences are created in a particular specialty, subject, or theme".

Two months are designated for elective rotations after completion of the examination at end of the third MBBS Part I and before commencement of third MBBS Part II. It is mandatory for learners to do an elective. 4 weeks in each block and 75% attendance is required. Block 1 in pre/paraclinical or basic science laboratory or ongoing research. Block 2 is for clinics or community clinics.

Nature of Learning

- Supervised
- Experiential
- Immersive
- Self-directed

Formative assessment is done and recorded in logbook.

Early Clinical Exposure

Introduced in first year of life to provide opportunity for students to correlate learning in Phase I subjects and clinical application. It aims to motivate students to learn and helps in professional growth and development. This is how early clinical exposure (ECE) relates basic sciences with clinical context.

Purposes

- Relevance of basic sciences in patient care
- To enhance basic science learning
- To increase motivation among students
- Role of attitude, ethics, and communication in physician-patient relationship
- Experience of social and cultural aspect of illness and study of humanities

Elements of Early Clinical Exposure

- Clinical context and basic sciences—correlation
- Human contact
- Introduction to humanities in medicine

Competency-based Assessment

Assessment is a systematic procedure for measuring a learner's progress or level of achievement against predefined criteria.

Purposes are the following:

- To enhance students learning
- Gives feedback to teacher to adjust teaching strategy
- Gives feedback to student to assess and improve his/her performance
- Discrete assessment of a domain may not always add up to a competency. Integration is required.

Types of Assessment

- *Formative assessment*: An assessment conducted during the instruction with the

primary purpose of providing feedback for improving learning. This is known as assessment for learning.

- *Summative assessment*: To know the sum of student learning after the end of instruction or system or end of year. It does not mean only university examination.
- *Internal assessment*: Range of assessments conducted by the teachers teaching a particular subject to know what is learnt and how it is learnt. It may have both formative and summative functions.

Skill Development

Skill laboratory is a safe and supervised environment for skill acquisition. It is mandatory for each medical college to create skill laboratory as per recommendation of NMC. List of skills have been prepared and some are certifiable before graduation. Different tools such as mannequins and standardized patients are used. Procedures such as basic life support, IV cannulation, and injections in different route can be learnt under supervision.

Logbook

"Is a *verified record* of the progression of the learner documenting the acquisition of the requisite knowledge, skills, attitude, and/or competencies".

National Exit Test

National Exit Test (NExT), required for admission to postgraduate medical programs and for obtaining a license to practice medicine in India. It will be conducted in two steps. The National Eligibility Entrance Test for Postgraduate (NEET PG) test is planned to be replaced by NExT. Step 1 involves theoretical examination with multiple choice questions (computer-based test). Step 2 conducts practical and viva voce examination. 50% marks in step 1 and successful demonstration for skills (pass/fail) in step 2 is the criteria set for scoring and scores is valid for 3 years. Candidate may appear in step 2 any number of times.

Other Relevant but Important Features

- To meet international standards
- History of medicine to be taught by specialists decided by curriculum committee
- Forensic medicine class will be in second year but examination in third professional year
- To include latest information and technology in the course
- Addition of new modules such as mental health and sexual health issues, medicolegal cases, ethics, and communication
- Addition of new relevant medical topics
- SDL plays an important role
- Assessment of AETCOM module requires separate approach

Section 3: Different Teaching Learning Methods

TEACHING IN SMALL GROUP (<30 MEMBERS)

Group discussion: Teacher is the leader where there is exchange of ideas among learners and teachers. Not only active participation of students, development of self-motivation, critical thinking, and problem-solving skills. Environment of working in a group favors teaching learning process. It is time consuming and dominant members may affect the outcome.

Seminar: Facilitator and 10–15 participants take part and presentation by predetermined participant(s).

Tutorials: Usually 10–15 learners guided by teacher and clear their doubts.

Practical/Demonstration: Bedside clinic

Group project: Complete understanding of the concept through wholehearted involvement under supervision of guide/mentor.

Role play: Participants are given a role to play for presenting a particular objective(s) in front of audience and help to develop communication skill and insight. Learners think independently and become more confident. It has also got social impact.

Simulation-based learning: Discussed separately.

Microteaching: Aims at developing teaching skills. Immediate feedback is its unique component and modified skills accordingly in teachers training.

Computer-assisted learning: Discussed separately.

Workshop: Experienced people 10–25 in number share their common experience about a problem and come to conclusion, also find its solution.

TEACHING IN LARGE GROUP

Lecture: Presenting facts and organized thoughts by a qualified person. Ideally 30% of time is spent on lectures and 70% engaged in active discussion.

Symposium: Chairman introduces the speakers. Speeches are given by different speakers on different aspects of a topic as per instruction of the chairman/moderator who summarizes at the end. No discussion among speakers. Audience may interact with the speakers at the end of a speech.

Panel discussion: Chairman introduces the speakers and topics of interest in front of audience where there is no set of speeches or order of speakers (panelists). Speakers present their views and knowledge is circulated over large number of people. Interaction between speakers and audience creates a good environment for teaching learning process. Chairman/moderator who summarizes at the end.

Flipped class: Before scheduled class, course content is supplied to the students. During class session, teacher guides, discusses, and helps in problem solving. Thus, this method helps to develop higher order thinking.

Field trip: Here students learn material in real-world situations. Teacher guides during the trip. This educational technique gives opportunity to verify what they have been taught and what they have learnt by observing the real scenario.

Film and video presentation: Jigsaw method ***(Fig. 2.3.1)***

Step 1: Divide the students into groups/teams (each group/team usually has four to six students). Each group/team has equal number of participants. These groups are called jigsaw groups.

Step 2: Break the concept (teaching material/course content) into pieces which equals the number of students in a group. But it does not mean that number of groups equal to number of pieces. If the total number of students are not equally divisive, you may give same task to two members in a group and distribute other extra students in that way.

Step 3: Assign one piece of content to one student in a group and thus each member of a group is given one different piece. Same is true for other groups. At this stage, members of a group do not interact with each other.

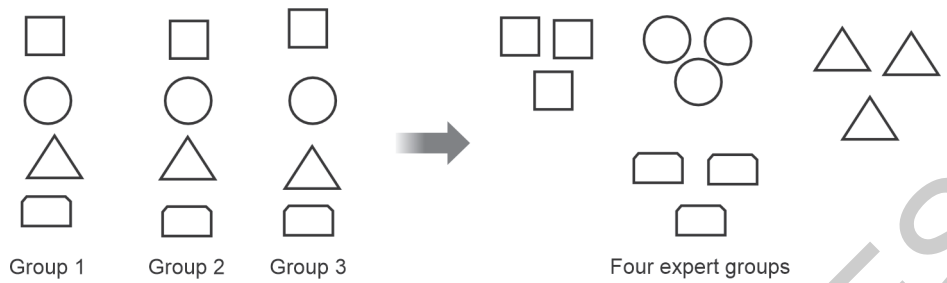


Fig. 2.3.1: Jigsaw method of teaching.

Everybody is busy with their own task and prepare independently.

Step 4: Now students having same task from different groups meet and form expert group. So, number of expert groups is equal to number of pieces of concept. After formation of expert group, there is sharing of knowledge among members with same task and better understanding of the task.

Step 5: Each member from the expert groups leaves and join with original jigsaw group. In each jigsaw group, members returning from expert group present his/her task in that group. Other members of that group listen carefully. Then other members with different piece of task returning from expert group presents in the same way. Thus, all the pieces are discussed in each jigsaw group.

Step 6: Assessment of all students using quizzes having questions on all pieces.

Assume shape represents one piece of task. Here one concept has been broken into four tasks. Jigsaw groups (groups 1, 2, and 3) have four members, each having different tasks.

INDIVIDUALIZED TEACHING

- *Problem-based learning:* Student centered, solve real-world problems in a group, and develop critical power of thinking.
- *Self-directed learning:* Discussed separately
- Simulation
- Project work

TOOLS OF TEACHING

- Chalk and board
- White board
- Overhead projector
- Video on liquid crystal display (LCD) panel
- Computer
- Software

Section 4: Self-directed Learning

Self-directed learning as defined by Malcolm Knowles (1975): "In its broadest meaning, SDL describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes". SDL can be utilized at all levels of learning including faculty development.

OBJECTIVE OF SDL

To develop lifelong learning skills.

SDL AND SELF-REGULATED LEARNING

Self-regulated learning differs from SDL and has been presented in **Table 2.4.1**.

WHO IS AN ADULT LEARNER?

An adult performs social roles assigned by culture and perceives him or herself to be essentially responsible for his or her life and whereas such responsibility and roles are not seen in a child.

PRINCIPLES

- Adults should be involved in planning and evaluation process
- Experience (including mistakes) provides the basis for learning activities
- They are interested in subjects having immediate relevance to them
- Adult learning is problem-centered

PROCESS OF SDL

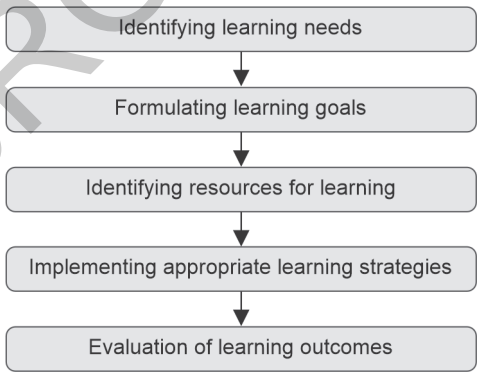
The SDL process is shown in **Flowchart 2.4.1**.

KNOWLES' ASSUMPTIONS ABOUT ADULT LEARNERS

- *Self-concept*: Adults move from being dependent on others to self-direction
- *Experience*: Adults gain experience and becomes a valuable tool
- Readiness to learn
- *Orientation to learning*: More interest in immediate application and problem-solving
- *Motivation to learn*: Self-motivation in learning as they grow

These assumptions can be utilized in classroom teaching in the following way (Knowel):

- Promote a positive climate for cooperative learning in classroom
- Research the interests and the needs of each adult learner



Flowchart 2.4.1: Malcolm Knowles' skill involved five-step model.

TABLE 2.4.1: Self-directed learning (SDL) and self-regulated learning.

Self-directed Learning	*Self-regulated Learning*
Concept of SDL comes from adult education	From educational and cognitive psychology
No facilitator is present in initial phase	Instructor/facilitator provides assistance to the learner in the initial phase
SDL is used in broader concept; self-regulation is present in SDL	Self-regulation is in microlevel and does not include SDL
SDL takes place outside the school environment	Typically takes place in school
SDL avoids spoon feeding and students can understand their needs and monitor their learning activities. It proceeds through general approach	Focusses on specific task in self-regulated learning

- Create learning objectives related with interests and needs
- Build on each subsequent activity to achieve the learning objectives
- Developing strategies and methods for instruction and identifying resources
- Review, modifications, and continuous evaluation of each activity for the next objective

CHOOSING SDL TOPIC

Unique features of SDL topic have been presented in **Figure 2.4.1**.

DESIRED OUTCOMES OF ADULT LEARNING (AS PER KNOWLES)

- *Self-knowledge*: As they grow, they learn better and find which is relevant and also understand their needs. They are conscious about self.
- *Global citizenship*: Adult learn to respect, help others in need.
- *Positive attitude*: Become open minded, accepting changes, and view each moment as a learning opportunity.
- *Seeking truth*: Find root causes of behavioral changes and find solution
- *Personality*: Establishes their roles in the society and express their potentiality

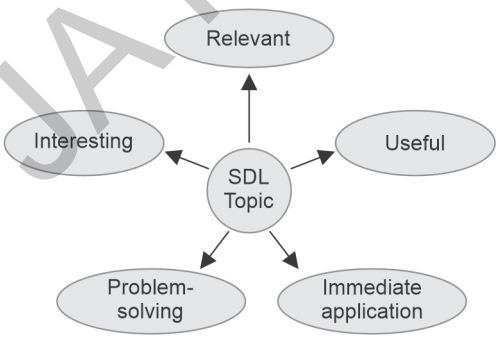


Fig. 2.4.1: Unique features of self-directed learning (SDL) topic.

- Essential values
- *Social order*: Able to mobilize social changes through intelligence to prove themselves as effective contributor to that society

KEY FACTORS ASSOCIATED WITH SUCCESSFUL ADULT LEARNING

A safe environment that should support individual needs, promotes, and encourages learning. Here an adult will be honored and give them intellectual freedom. Learners can use their potential to learn effectively, and active participation is there. Process of mutual learning and feedback from students help the educator to make necessary changes for ideal learning environment.

MEDICAL EDUCATION AND SDL

Self-directed learning helps in medical education in following ways:

- Students learn at their own pace and can manage huge load of learning material
- Able to update their knowledge continuously
- Understand their difficulty in learning process
- Identify relevance and application of learning outcome
- Improves the learning process and can link with other context of learning
- Cost is reduced as resource decreased and can overcome shortage of faculties. Higher studies become easy through e-learning.
- Helps in development of lifelong learning skill and student become globally relevant

ADVANTAGES

- Becomes effective *lifelong learner*
- Increases power of thinking and judgement

- Becomes independent, self-disciplined, and self-confident
- Develop different types of skills (management skill and decision making skill)
- Develops leadership pattern and sense of responsibility
- Self-motivated, lifelong learner, and becomes globally relevant

DISADVANTAGES

- Team spirit absent
- Some adults are confused, lack confidence, and unable to engage in SDL
- Sometimes misguided with learning materials
- Time consuming
- Needs to be combined with other methods of learning

ASSESSMENT OF SDL

- Project work
- OSPE/OSCE
- Self-assessment through online
- Examination-theory and practical
- Questionnaire

SELF-DIRECTED LEARNING IN DIGITAL WORLD

Information technology plays major role in SDL as follows:

- Providing online learning materials
- Gives platform for resource materials
- Learning process as well as discussion through online mode (google apps, etc.)
- Performance evaluation through feedback. Different applications are available.

BE A SMART SELF-DIRECTED LEARNER

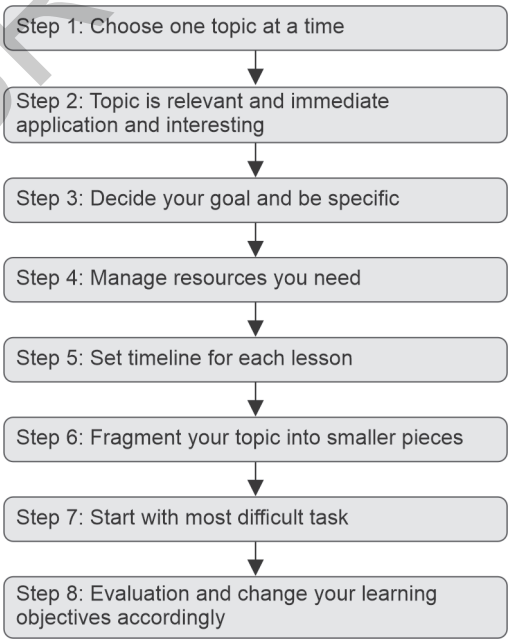
Steps of smart self-directed learner are given in **Flowchart 2.4.2**.

APPLICATION OF SDL

Application of SDL is depicted in **Figure 2.4.2**.

FREQUENTLY ASKED QUESTIONS IN SDL

1. What is the basic difference between pedagogy and andragogy?
2. What is self-learning and problem-based learning?
3. What are the different skills required in SDL?



Flowchart 2.4.2: Smart self-directed learner.

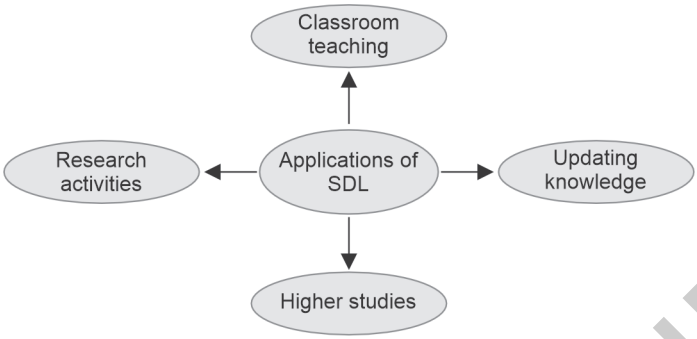


Fig. 2.4.2: Applications of self-directed learning (SDL).

4. Write down steps of SDL.
5. How teacher-directed method differs from learner-directed method of learning?

Section 5: Simulation Technology in Medical Education

Simulation refers to an artificial representation of a real-world process to achieve educational goals through experiential learning (learning through experience as a result of interaction and involvement with the environment). Experiential learning, which is a part of simulation during which the learner constructs knowledge by linking new information with previous experience. Psychomotor skills of a future physician in an apprentice-style model of "See One, Do One, and Teach One" is no longer considered appropriate because of the increasing concern for the quality of patient care and safety issues. Medical simulation is relatively a new concept. Simulation technology is being used in many different high-risk fields since many years. Simulation mimics real-world conditions that should not be experienced first-hand by trainee because of their inexperience or risk to patients. These serve as an alternative to real patients and can learn through repeated mistakes without causing any harming to real patients. Simulation aims to enhance clinical competence in patient's outcome in medical education both at the undergraduate and postgraduate levels in addition to knowledge acquisition. In true sense, simulation process develops a model for a process and then we perform experiments on that model to predict the behavior of that process. Process is carried out mostly by a team and an environment is created that resembles close to real life. Integration of simulation with clinical environment is an essential part during curriculum development process as it is not replacement of learning in real scenario.

WHY SIMULATION IN MEDICAL EDUCATION?

- To reduce cost
- Minimizing serious medical errors in patient care
- Risk to patient is less when exposed in real-world scenario
- Confidence of doctors increased
- Improving quality of patient care

COMMON SIMULATION TECHNOLOGIES USED IN MEDICAL EDUCATION

- Computer-based simulations
- Mannequins
- Simulated/standardized patient
- Virtual environment
- Hybrid simulations
- High fidelity simulation that closely resembles real-world situation in all respects
- Tissue-based simulation

INFRASTRUCTURE REQUIRED

- Manpower (trained faculty, technical staff, and others)
- Multimedia
- Medical instrument, defibrillator, trolley, and others
- Mannequins

DIFFERENT TYPES OF SIMULATIONS

Three types: Written, audio-visual, and live-simulated simulation.

SIMULATORS

Based on resemblance to reality, simulators are classified into low-fidelity, medium-fidelity, and high-fidelity simulators.

ADVANTAGES OF SIMULATION TECHNOLOGY

- Experience with teamwork
- Improvement in all domains of learning—cognitive, psychomotor, and affective
- Both slow and fast learners are benefitted
- Complex mathematical programming can be avoided
- Less risk to patients and learners
- Invasive procedure can be learnt efficiently before actual exposure
- The trainees become more efficient and confident through repeated practice and allowing mistakes
- Simulators capture clinical variation and individualized learning becomes easy
- Exposed to rare/uncommon and complex situations can be conducted
- Debriefing helps in immediate feedback of the sessions
- Multiple learning strategies can be practiced and definition of outcome is clear cut
- All the processes are carried out in controlled situations
- Simulation models are flexible and can be modified when needed
- No ethical issues

DISADVANTAGES OF SIMULATION

- Thorough understanding of the factors in the process is essential to perform the simulation process
- It is not replacement of real-world scenarios
- Models may be damaged
- Time consuming

LIMITATIONS

- Sometimes it is expensive
- All situations cannot be solved using simulation process
- Sometimes, quantification of variables is not possible

APPLICATIONS OF SIMULATIONS IN MEDICAL SCIENCE

- Teaching-learning process (experimental and clinical pharmacology)

- Patient care (resuscitation, endoscopy, IV channel, and many more)
- Assessment of professional competence
- Pharmacokinetic and pharmacodynamic modeling and drug development

DEBRIEFING IN SIMULATION

It is the cornerstone of simulation-based learning. After the learning session, learners share their experience about the process and also have the opportunities to ask questions or clearing doubts. It bridges the gap if found during the session and thus improves learning outcome.

CHALLENGES

Simulation technology is now becoming popular in medical education where basic knowledge is being utilized in clinics by doctors with confidence. Quality of patient care is also improved with prior skill training through simulation. Simulation process though highly useful, multidisciplinary approach and training program for skill development in this technology involving faculties are essential. All resources are to be kept ready for proper functioning. Maintenance and upgrading of the equipment pose challenges to the system. Cost is high in some cases and time consuming also. To create interest among new generation is also difficult at the initial stage.

Section 6: Developing Objectives from a Competency

BACKGROUND KNOWLEDGE

- For a particular activity, setup certain goals
- Then identify certain roles to achieve goals
- Develop competencies for each role
- Define objectives for each competency

Let us take an example: Goal of undergraduate medical curriculum is to produce competent IMG. For this *goal*, five *roles* have been identified:

1. Clinician (15 competencies)
2. Communicator (six competencies)
3. Leader and member of healthcare team system (four competencies)
4. Lifelong learner (five competencies)
5. Professional (five competencies)

Now, for each competency we have to frame objectives.

Thus, Goals → Roles → Competencies → Objectives, then follows the process of teaching learning with appropriate methods and tools and finally assessment with assessment tools.

COMPETENCY

A measurable set of knowledge, skills, and attitudes that a person needs to perform a task effectively. So, competency is measurable, and it includes one or more domains of learning. Learning domains are knowledge, skill, attitude, communication. The expected level of achievement identified as—knows (K), knows how (KH), shows how (SH), and perform (P). "Perform" indicates independent performance without supervision in real-world situation.

OBJECTIVE

These are specific statements and instructions and tells what a learner is intended to learn.

PURPOSES OF OBJECTIVE

- Selection of content
- Planning strategy of instruction/teaching learning session

TABLE 2.6.1: Different levels of learning domains.*

Cognitive/knowledge	*Psychomotor/skill*	*Affective*
Remember	Perception	Receiving
Understand	Set	Responding
Apply	Guided response	Valuing
Analyze	Mechanism	Organizing
Create	Complex overt response	Internalizing
Evaluate	Adaptation	
	Origination	

*From above downward simple to complex behavior.

- Arranging tools for teaching learning method
- Linking with assessment
- Deciding assessment tool after the session

Each domain is divided into levels and starts from simplest to the most complex behavior **(Table 2.6.1)**. Now for each level, there are few verbs used to indicate change in behavior. So, you will have to be familiar with those verbs along with the meaning of the level. This is the most important part while framing objectives. So, to develop objective, one key verb is required in its structure. We will gradually proceed to develop objective at each level in a particular domain.

ABCD MODEL FOR WRITING OBJECTIVES

A for *Audience*: Learner

B for *Behavior*: The observable and measurable behavior is expected in the learner. Key verbs are attached here.

C for *Condition*: The context or situation and sometimes it may refer to specific tools or instruments in the lesson. Conditions should influence behavior also.

D for *Degree*: The extent or level of expected performance:

- Until a score of 90% is achieved
- For a total of two times in a practical session
- With no errors
- In <10 minutes

Sometimes all the components may not be present. Here C and D may or may not be present in framing objectives.

Finally, you should check, the objective is also *SMART*.

S (Specific): Goal should be clear and specific to focus your efforts. Related with five "W" questions:

- What learners should achieve?
- Why is it important(purpose)?
- Who is audience?
- Where will the lesson be given?
- Which resources or limits are here?

M (Measurable): Assessing progress is essential. A measurable goal should address questions such as:

- How much?
- How many?
- How can I know when it is completed? Change in behavior and its direction is obvious.

A (Achievable): Realistic based on constraints, limitations, time, and other related resources.

R (Relevant): Objective will help to reach the goal. It should be applicable in this current time and environment.

T (Time): Definite time frame to achieve the objective. To be realistic.

Essentials of
POSTGRADUATE PHARMACOLOGY & BIOSTATISTICS
Guidebook to Postgraduate Trainee in Pharmacology

Salient Features

- An invaluable resource—not only for postgraduate trainees but also for all those engaged in postgraduate teaching and learning
- Incorporation of chapter on Competency-based Medical Education (CBME)
- Provided with latest evidence-based information to strengthen clinical understanding and improve patient care
- Ensuring the content remains both practical and examination-focused
- Role of postgraduate trainees in the teaching–learning process, a major highlight of this edition
- Flowcharts, figures, and section on Frequently Asked Questions have been refined for clarity and relevance
- Experimental Pharmacology section has undergone a major transformation
- New section on Electrocardiography

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Shelving Recommendation
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