Outcome-based Medical Education: Having the end product in mind

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Objective

- Discuss the importance of change or evolution in a curriculum
- To provide an overview on Outcome-based Medical Education (OBE)
- To discuss the key terms and concepts in the development of an outcome-based curriculum and how these are derived
- To describe assessment methods in OBE
- To share challenges in the implementation of OBE at International Medical University (IMU)

What is a Curriculum?

- ✗ Schedule of classes
- ✗ Syllabus
- ✗ Lecture notes
- ✗ What is being assessed

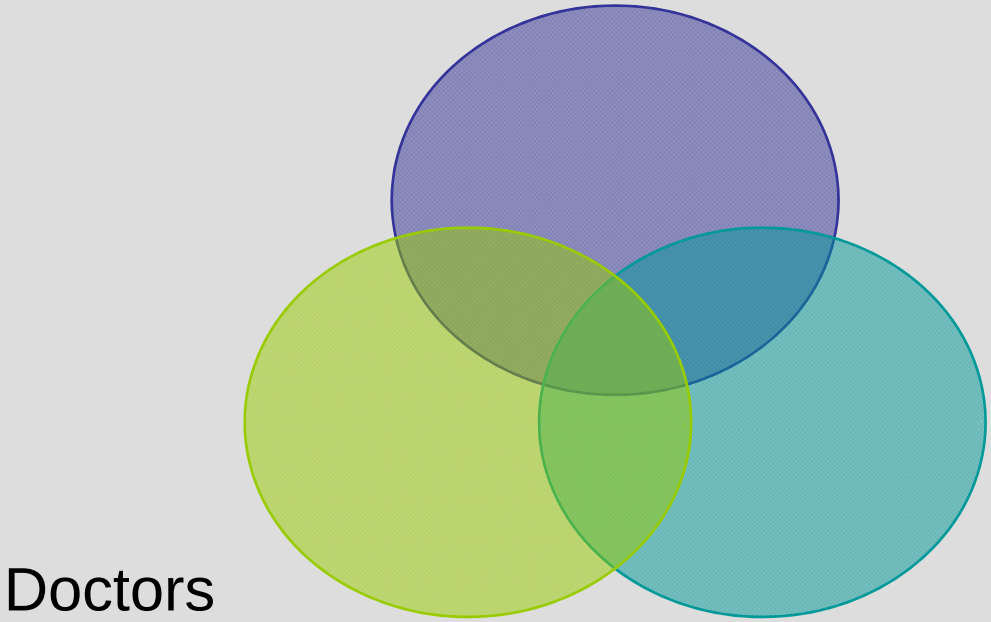
- ✓ It is ALL the planned learning experiences of a school/ institution
- ✓ It is ALL that should happen in a teaching programme

Undergraduate Medicine

- Most medical schools have a 5-6 year course

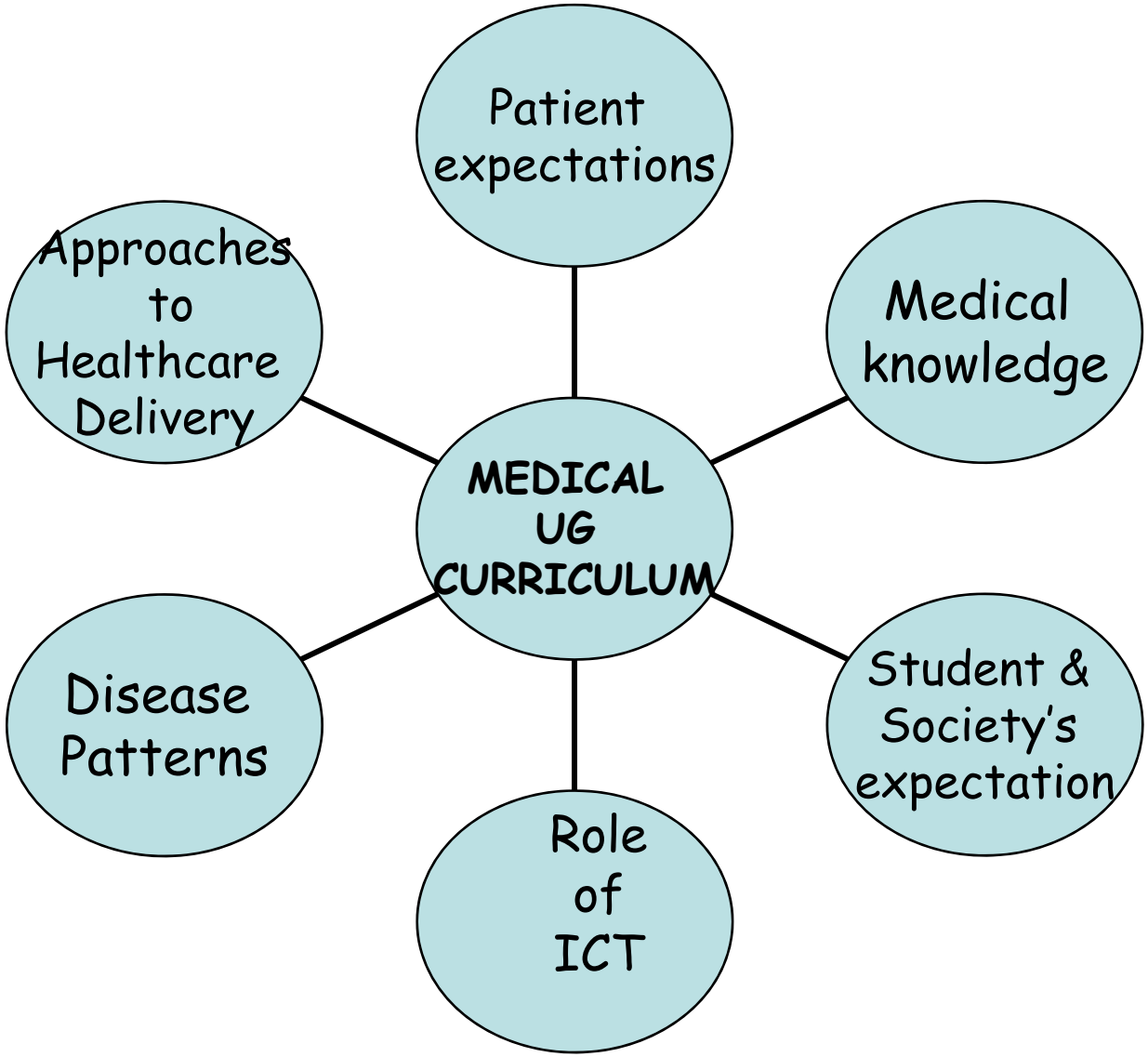
- Various type of curriculum
  - Disciplines (Traditional)
  - Body-system (Integrated)
  - Learning Outcomes (OBE)
  - etc

Interaction of key areas



Ref: Dent JA and Harden RM Practical guide for Medical Teachers 2003

What are the changes?



Questions

- What is the goal of a medical school in ? Japan ? Malaysia
- What kind of doctor do we want to produce?

What is an Outcome-based Curriculum (OBC)?

- An educational approach driven by the **outcomes** the students should display by the **end** of a course

  (McNeir, 1993)

- "Product defines process"

  (Cohen, 1994)

→ In OBC, the outcomes agreed for the curriculum **guides** what is taught and assessed.

Outcome-based Curriculum

Outcomes form the basis for organising the curriculum i.e. the:

- content,
- delivery,
- assessment (of learner) &
- evaluation (of program/ course)

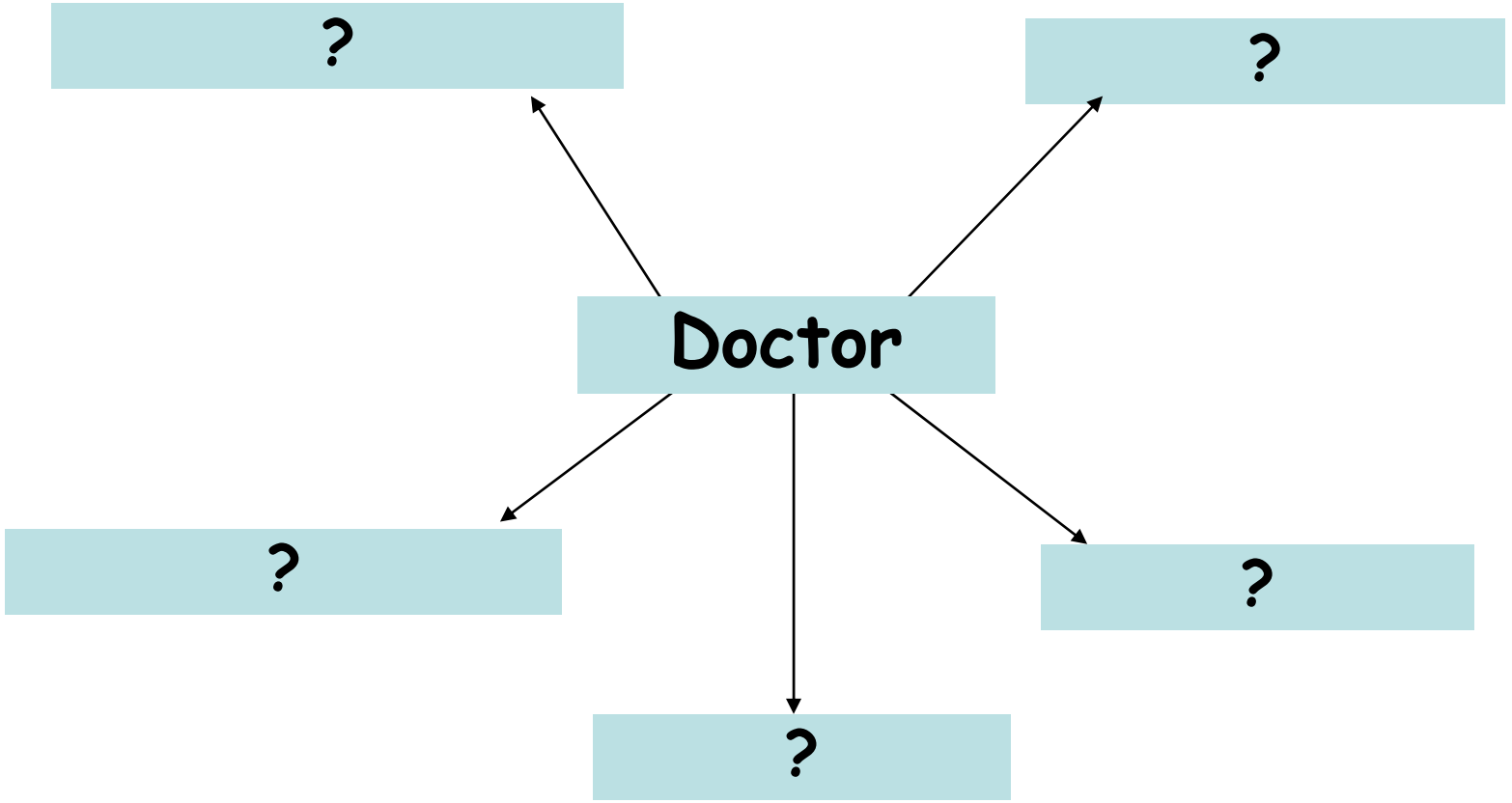
Questions

- What kind of doctor do we want to produce?

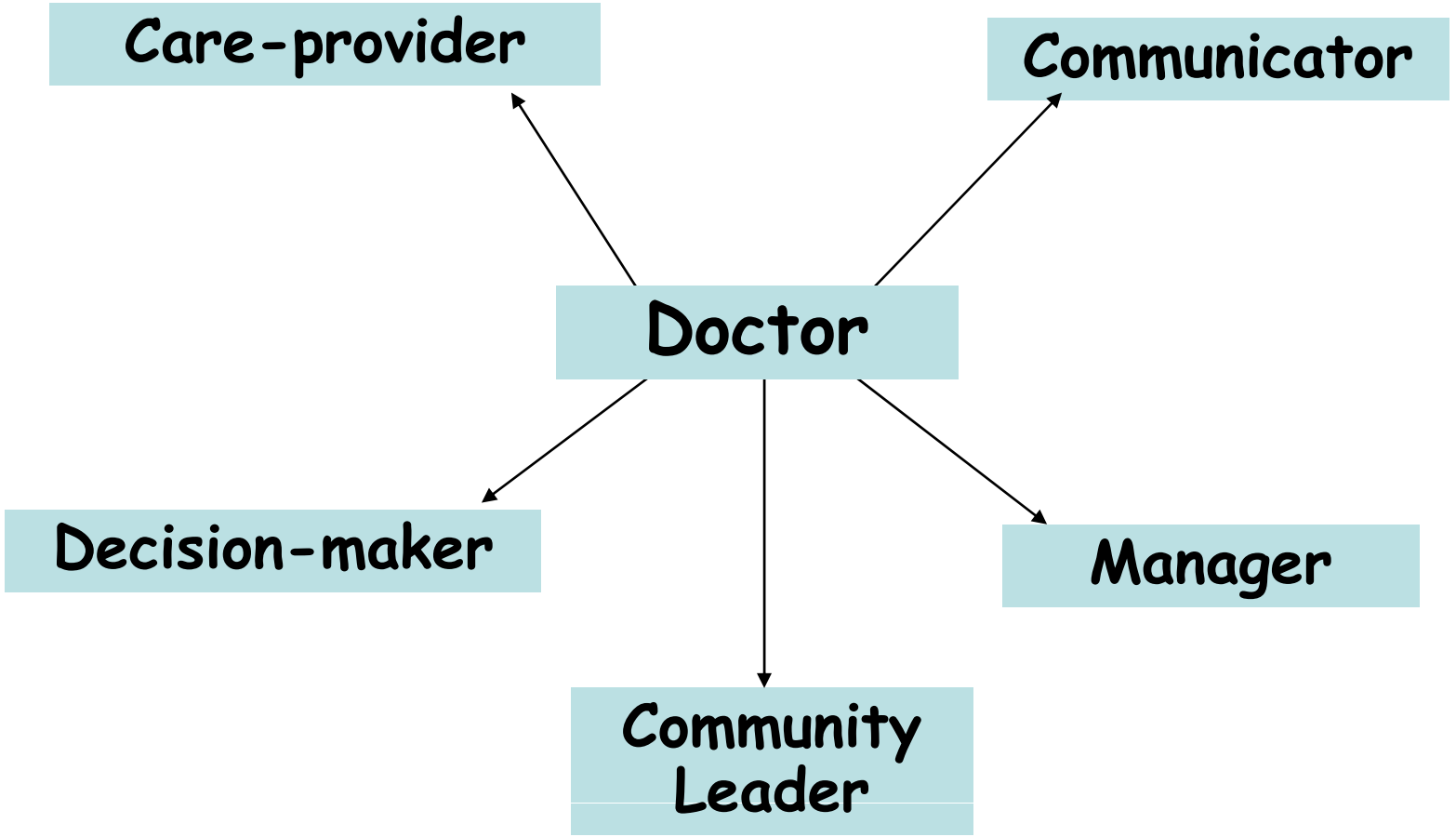
  → consider what kind of doctor you would want to treat you?

  → what competences should the doctor possess?

Medical doctor from TODAI or other medical schools in Japan



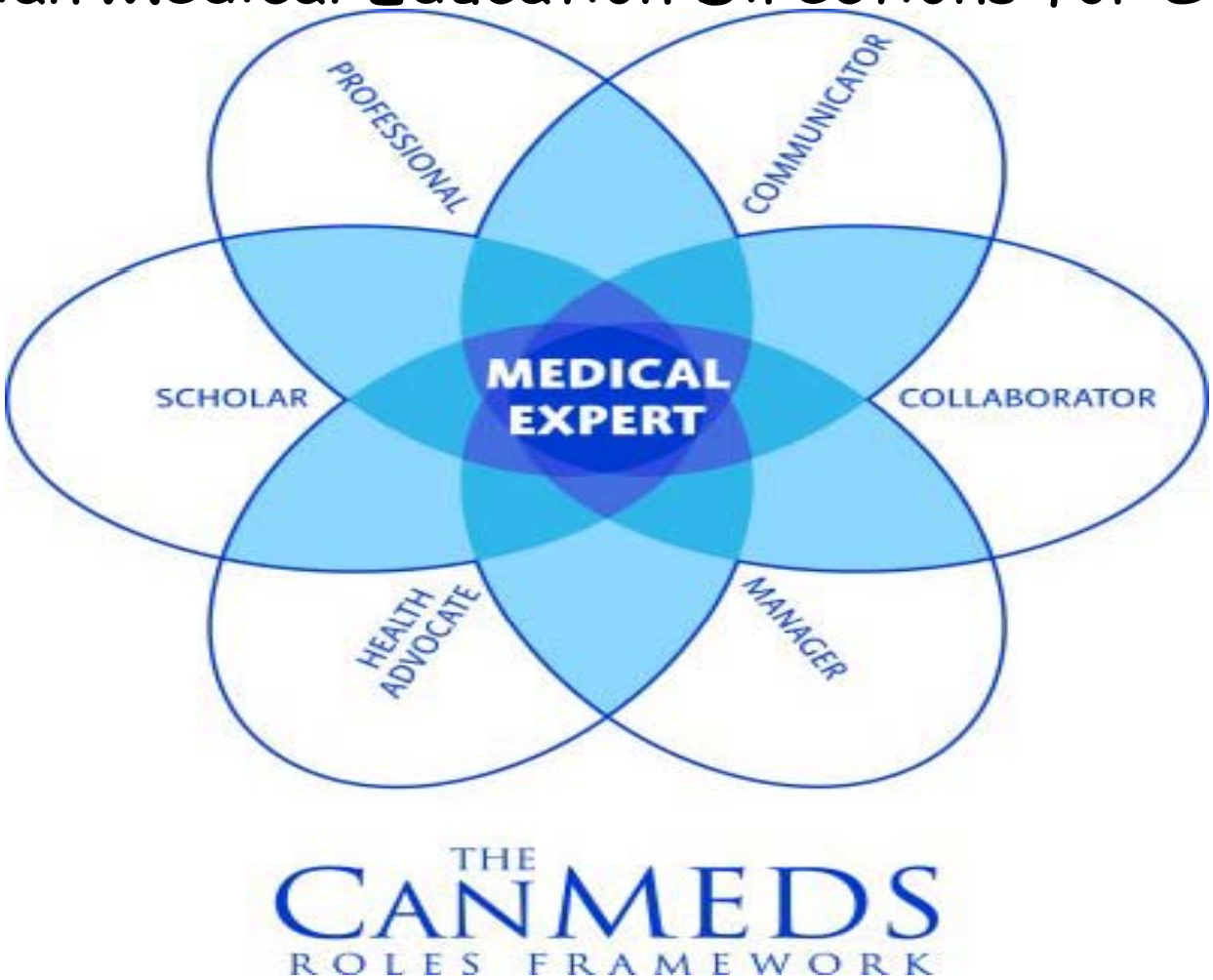
World Health Organisation (WHO)



Source: www.who.int/

CanMEDS Roles:

Canadian **M**edical **E**ducation **D**irections for **S**pecialist



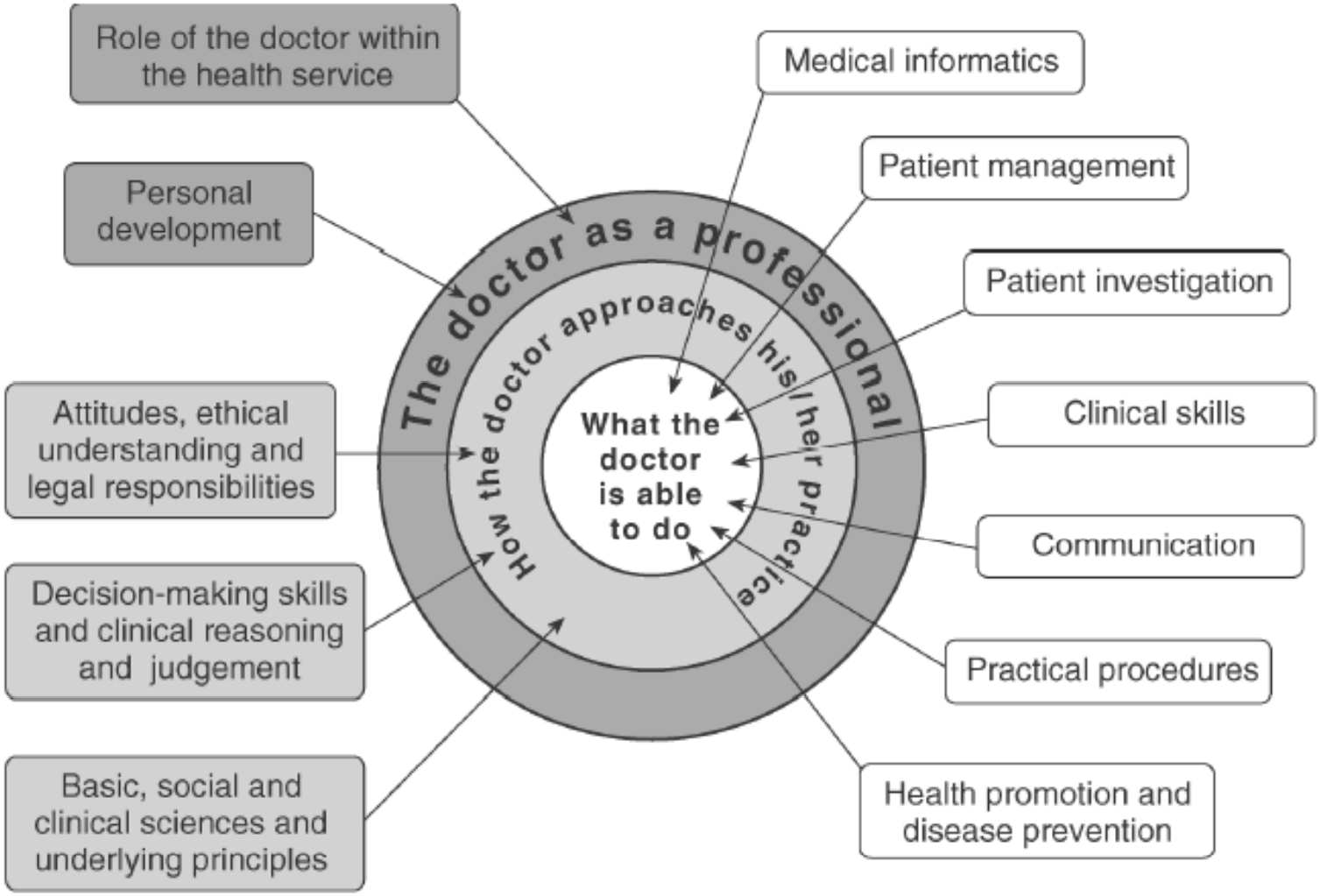
Source: rcpsc.medical.org/canmeds/index.php

Six Outcomes of Postgraduate Training: ACGME (Accreditation Council for Graduate Medical Education)

- Patient Care
- Medical Knowledge
- Practice-Based Learning and Improvement
- Interpersonal and Communication Skills
- Professionalism
- Systems-Based Practice

ACGME Outcome Project: http://www.acgme.org/Outcome/

The Scottish Deans' Medical Curriculum Group's Three circle model



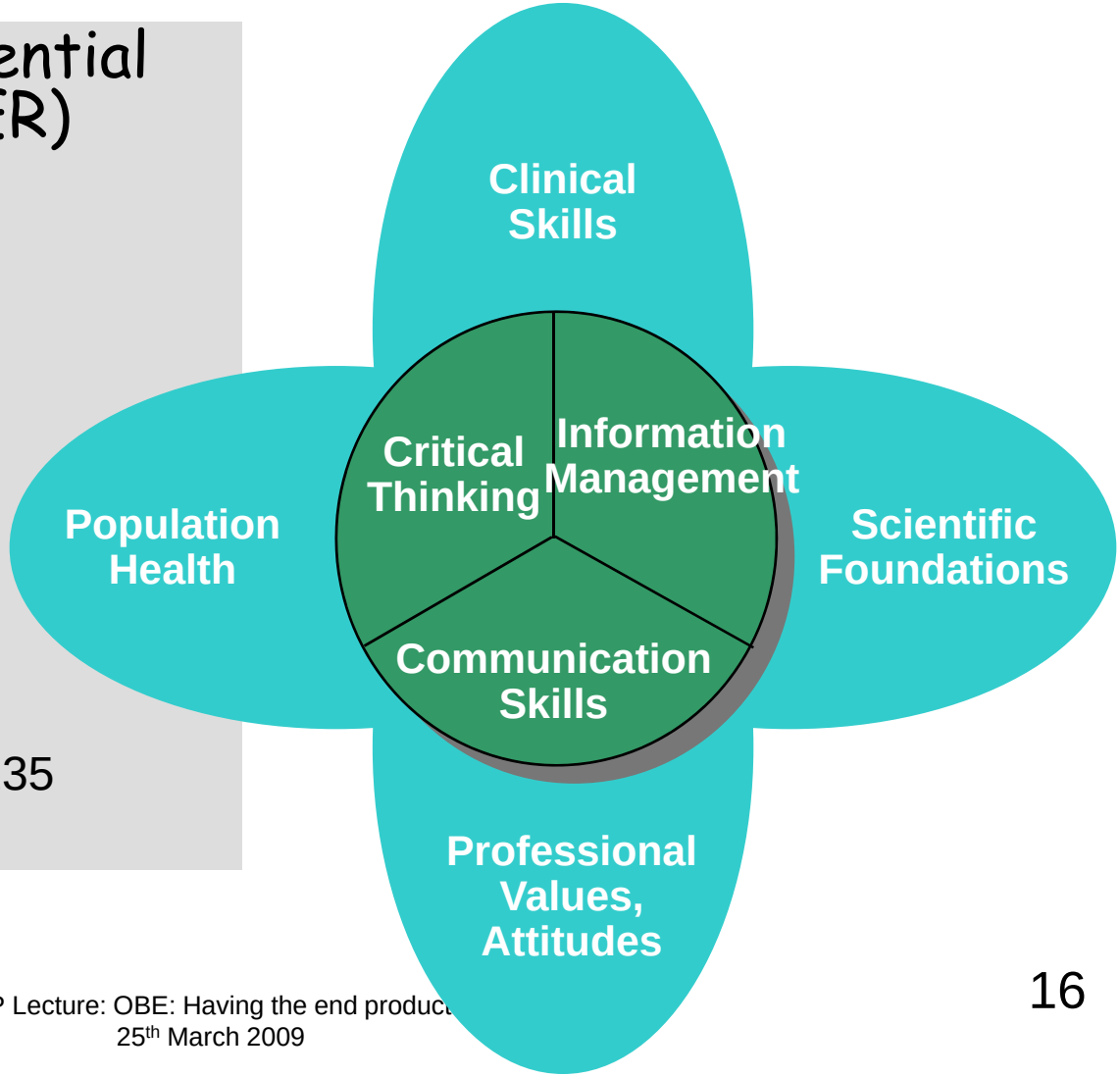
Ref: Simpson et al. Med Teach 2002, 24, 136-143

Institute for International Medical Education (IIME)

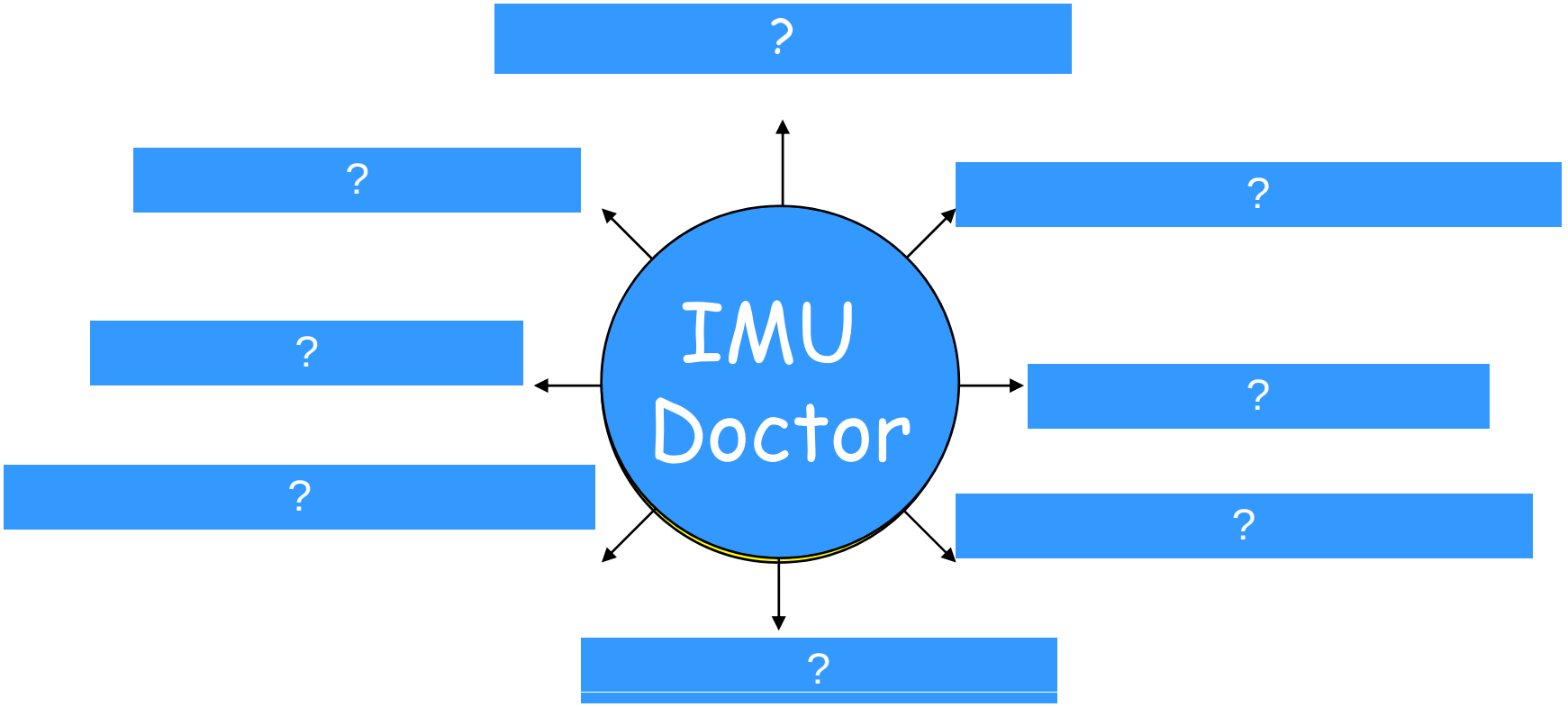
Global Minimum Essential Requirements (GMER) in medical education

Source:

Med Teach 2002, 24, 130–135



IMU OUTCOMES



How did we derive at IMU 8 Outcomes?

What sort of doctors do we want to produce?

- What are the competencies that our graduates should possess?
- What are the professional attributes that they should acquire / possess in order to function as effective intern / doctor?

Factors taken into consideration:

1. What are the expected outcomes in terms of knowledge & skills?

2. What are the expected attitudes?

3. What are the needs of the local health care system and the community?

The Steps

1. How to **develop** an outcome-based curriculum?

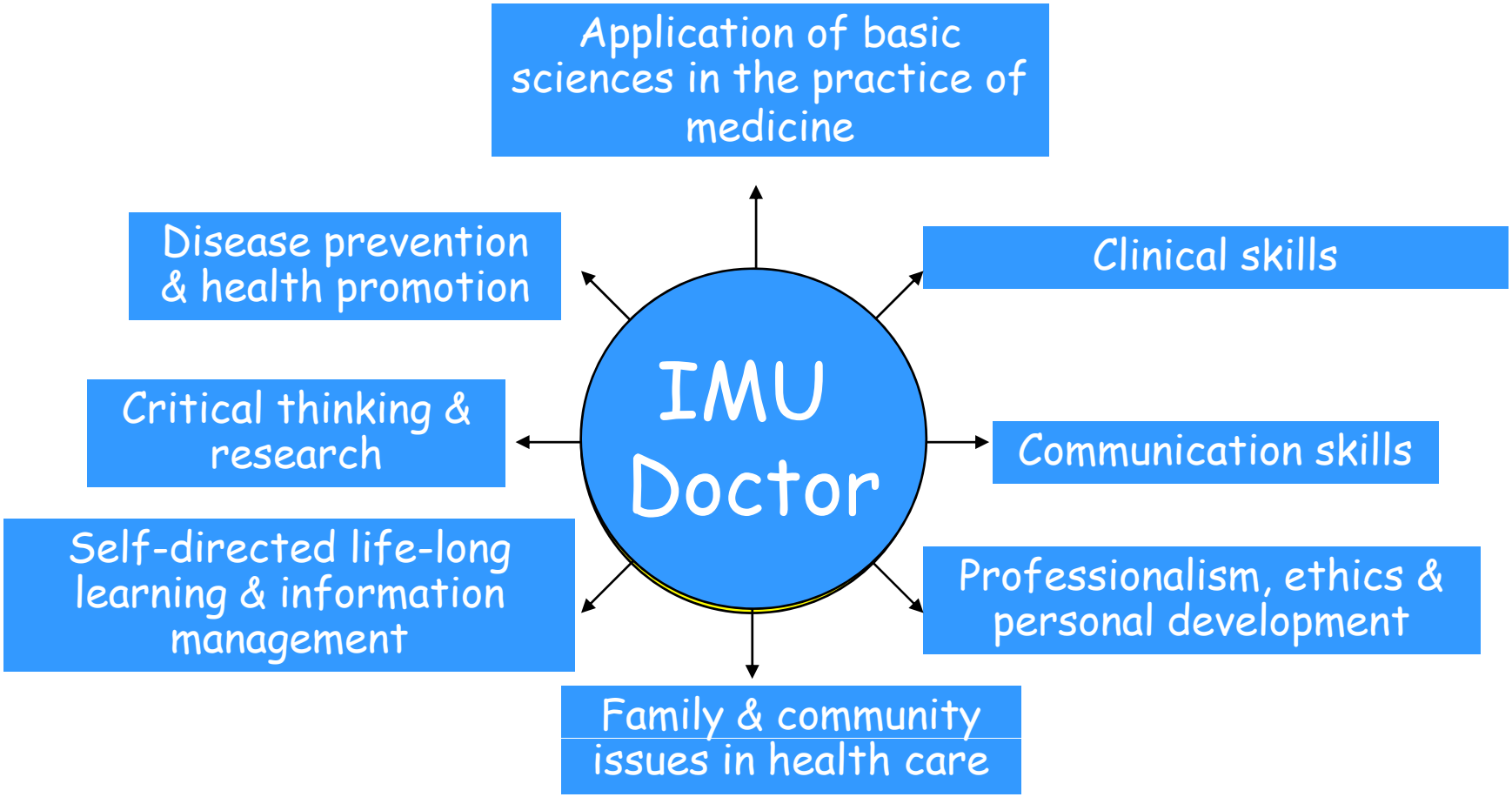
2. Issues in **implementing** an outcome-based curriculum

How to develop an OBC ?

Step I:

Determine the exit Outcomes – the major outcome domains

The 8 IMU OUTCOMES



Step II

Identify the competencies in each of the major outcome domains

Competencies

- Each competency is likely to have several components/ levels of difficulty / progression
- Have to be taught over a period of time
- Some require revisits for reinforcement

Step III

For each of the competencies,
Identify/ determine the components / differing levels of difficulty or progression/ milestones etc

For e.g.

Communication skills

- Interviewing skills (early) :
  Initiating an interview/ rapport building / putting the patient at ease/ encouraging patient to talk / patient listening/ showing empathy / summarising etc

- Breaking bad news (intermediate and clinical years):
  Breaking an unpleasant news/ breaking bad news / death and dying

Step IV

Broad outcomes → more specific, measurable outcomes

→ "Design down" process

Determine when the components of the competencies will be taught/ learnt- by phase/ year/ semester / course/ module /rotations etc

Traditionally…

An example:

Teaching of the Cardiovascular System in a medical UG Programme

Traditionally..

At the Introductory level e.g. pre-clinical):

-> Describe the anatomy / physiology of the heart (surface learning)

At the clinical level:

-> Clerking a patient with heart disease, CVD (AMI, Arrhythmia etc)

Outcome-based Curriculum (OBC)

An example:
Cardiovascular System in a UG Medical OBC

Exit Outcome: (at graduation)
- Diagnose and manage patients with CVD

Intermediate Outcome: (early and later clinical phases)
- Take a cardiovascular history of a patient.
- Perform a cardiovascular examination.

Introductory Outcome: (phase 1/ pre-clinical)
- Describe the anatomy/ physiology of the heart including the coronary vessels

Step V (a) : Detailed "Design Down"

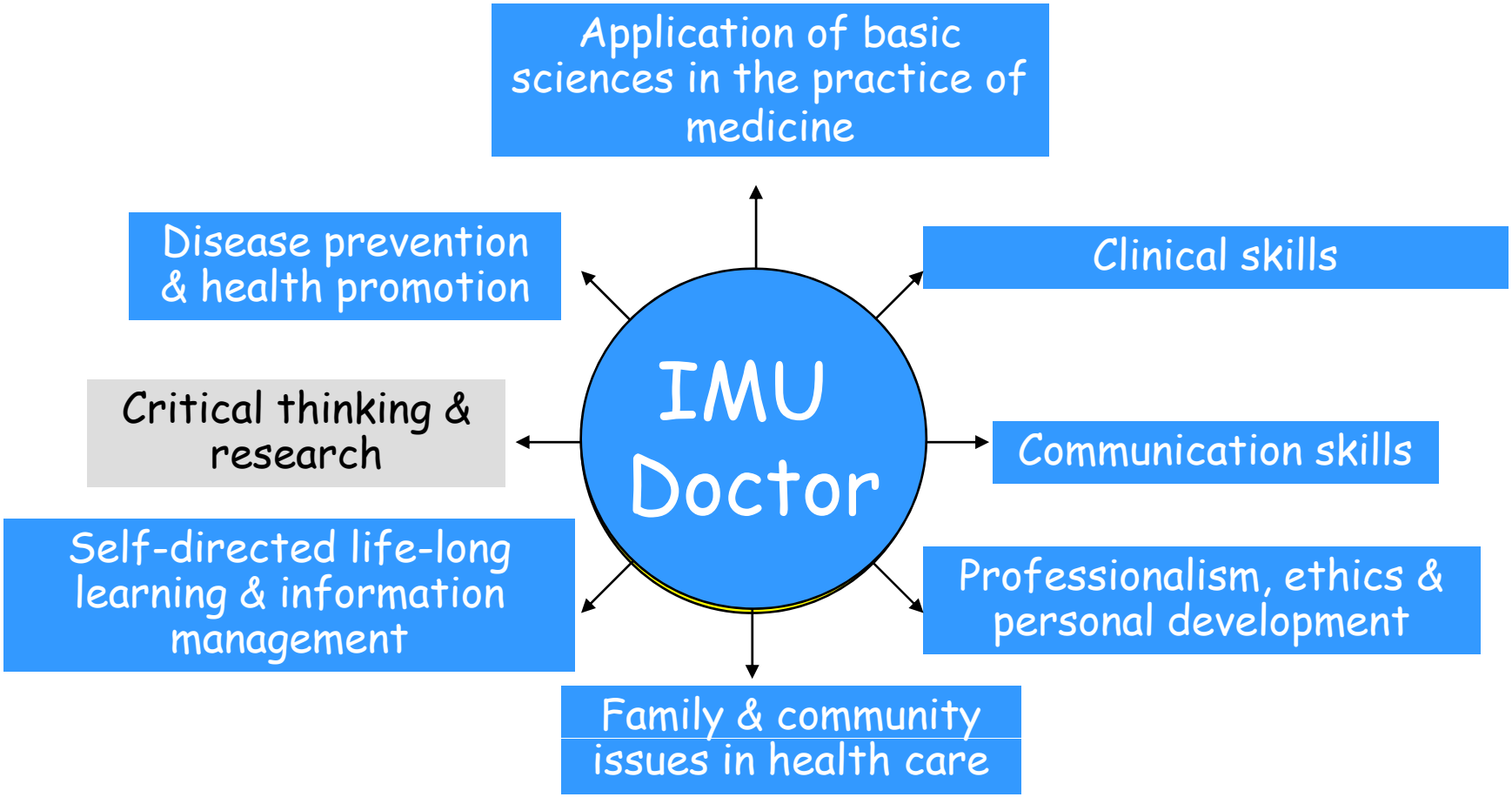
Exit Outcomes

Phase Outcomes

Year / Semester Outcomes

Course / Module / Posting / Rotation outcomes

The 8 IMU OUTCOMES



Phase Outcomes

Outcome: Critical thinking & research

Phase 1:

Demonstrate understanding of the research methodologies
Demonstrate knowledge of the statistical methods used to analyze research data
Demonstrate ability to collect data and scientifically analyze data
Demonstrate a grasp of the principles of EBM / best-evidence practice

Phase 2:

In addition to the above
Write a research proposal
Demonstrate ability to collect data and scientifically analyze data
Demonstrate the use of EBM in making clinical decisions
Critically appraise a journal article

A practical point …

- ✓ Application of Basic Sciences
- ✓ Clinical skills; diagnosis & management

Occupy a major part of the curriculum.

Step V (b)

In parallel, develop the core curriculum for e.g. topic-based / case-based/ problem-based

Experience at IMU

Identification of "core problems"

Generally about **120** clinical topics/ problems (one topic/problem per week)

e.g.

chest pain, cough, headache, abdominal pain

etc.

Step VI….

- For each case/ problem/ topic, write down the specific objectives with regards to basic sciences, and clinical skills
- Reorganise the objectives by phase/ year

Step VII

Having identified the core competencies in basic sciences & clinical skills,

- Add in the relevant competencies from the **other** outcome domains
- Develop a **learning guide** for each core topic / problem

Learning Guides

Organise the **learning outcomes** under the exit outcome domains

Identify issues for **in-depth study** by year/ course/posting

Curriculum delivery..

After **developing** an outcome-based curriculum…

→ How to **deliver** the curriculum

Curriculum delivery

Each course/ Module/ posting or rotation coordinator now has:

1. A document identifying the relevant learning outcomes and

2. Learning guides for each relevant core topics / problems

Step VIII

- Determine the delivery methods - in line with the University philosophy

Curriculum delivery

Teaching and learning delivery:

- Large-group sessions
  - Lectures
- Small-group sessions
  - Bedside / clinic sessions
  - Problem-based learning (PBL) → task-based learning (TBL)
  - Clinical skills sessions
- Self-study

Step IX

- Teaching tool
- Develop / identify the "lesson outcomes"

Step X

Develop a curriculum map

Identify where and how the various competencies in a Course / Module /Posting / Rotation would be delivered

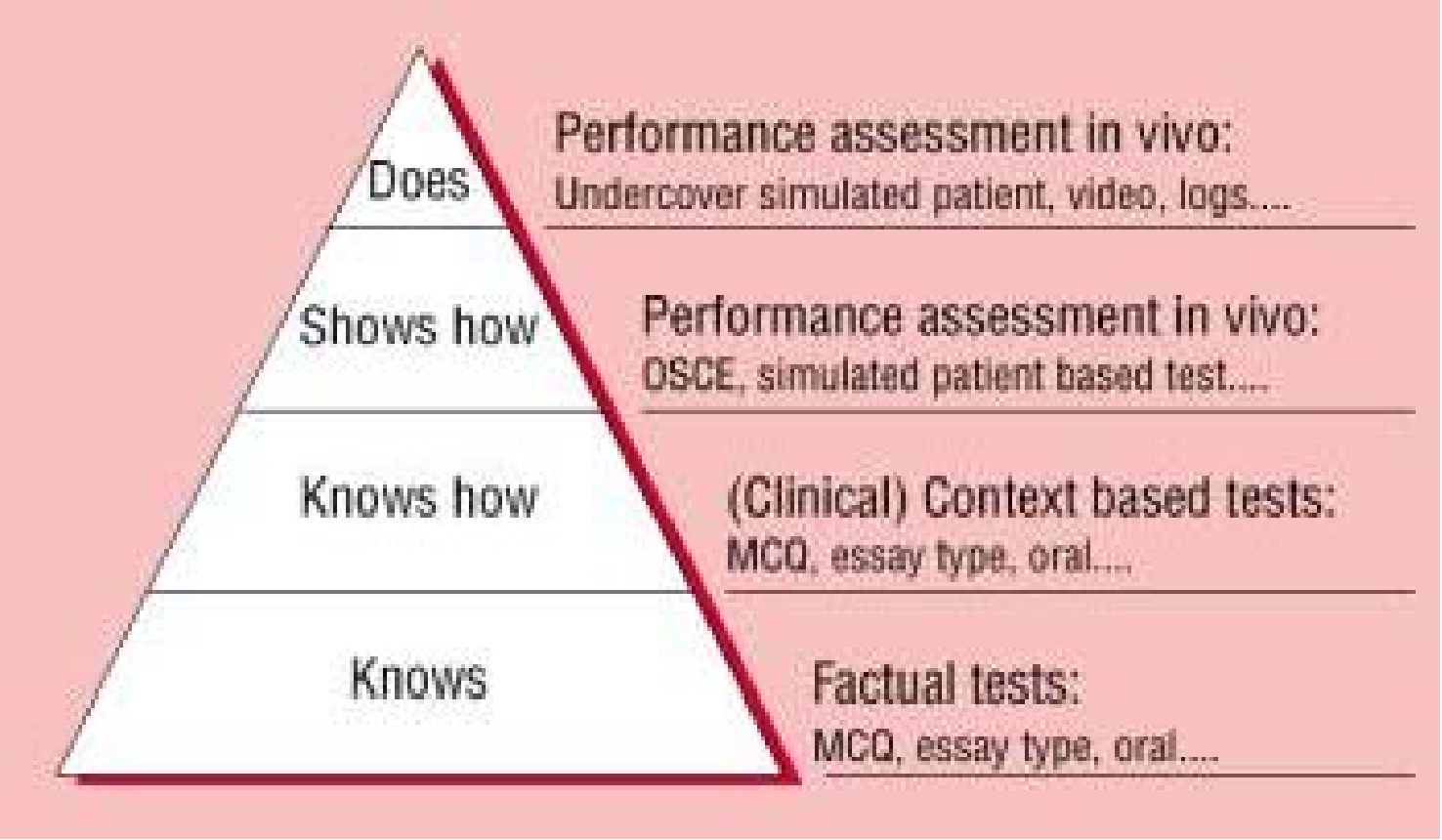
Step XI…..

Add in the relevant **Assessments** to the curriculum map

- Develop a matrix matching assessments against outcomes

Assessing clinical competency

Miller's pyramid



Miller GE. Acad Med 1990;65:S63-S67

Taxonomy & Assessment

Taxonomy	Recommended assessment
Recall	MCQ, SAQ
Application	Essay (MEQ, PMP), Viva, Thesis
Attitude	Record of unprofessional behaviour, Observational log
Skill	OSCE, Direct observation (Mini-CEX)
Performance	Patient survey, 360 degree assessment

Assessing Competency

Assessment

- Knowledge: MCQs (S6) , SAQ (S7)
- Problem-solving: MEQs (S9), Viva-voce / Portfolio reviews (S10)
- Attitudes: Rating scale, peer/tutor/nurse assessment (S10)
- Skills: OSCEs, Video reviews, Mini-CEX, Short cases and long cases (S6-S10)
- Behaviour: attendence, participation (observation in real settings)

The curriculum map

Table / matrix showing the competencies under the outcome domains and, how it will be delivered and assessed

Matrix showing Assessment Tools against the Outcomes

	Clinical Exam	MCQ	Projects	Portfolio	SAQ / MEQ	CFCS	OSPE/ OSCE
Application of basic sciences	**	****					
Diagnosis , management & prevention	****	***			****		****
Problem solving				****	****		
Self-awareness, personal growth & life-long learning			**			***	
The family & community contexts of health care						****	**
Moral reasoning and Medical ethics				****			***
Appropriate Use of Technology				***			***
Critical appraisal			****	****			

Curriculum Mapping

The 8 IMU OUTCOMES (Revised Jan 2004)

TABLE – 2: APPLICATION OF BASIC SCIENCES IN THE PRACTICE OF MEDICINE

		Phase 1					Phase 2				
	SEMESTER	1	2	3	4	5	6	7	8	9	10
	WEEKS	26	26	26	26	26	26	26	26	26	26
	CLASS	17	23	18	18	18	24	18	18	18	24
	MISCL*	3	0	3	5	3	0	3	12	3	0
	EXAM	2	0	2	0	2	0	2		2	2
	VACATION	4	3	3	3	3	2	3	2	3	0
		PBL, Lectures, Online, CSU, Lab demonstrations, Medical Museum					Clinical rotations, TBL, seminars, bedside teaching, IMS, CFCS				Clinical rotations
			GP, Community, Hospital								
					Clinical correlations, Integrated clinical skills						
	Courses	Foundation 1	Foundation 2, CVS	Resp, Haem, GI	Endo, Renal, Repro	NS, MS, Health Issues	Med, Surg, Fam Med Paeds & Child Psychol	O&G, Psych: personality & CBT, Ortho	Opthal, ENT, Derm, Clin Path, Fam Med; Selective & Elective	Med, Surg, Paeds, O&G, Radio &, Anaes	Senior Clerkship
COMPETENCIES		Refer to Study guides for specific objectives					Refer to Task-based learning (TBL) Study guides in each discipline for the core facts in clinical phase				
The normal structure and function of the body as a complex of adaptive biological system Molecular, cellular, biochemical and physiological mechanisms that maintain the body's homeostasis Abnormalities in body structure and function which occur in diseases. Aetiology and natural history of acute illnesses and chronic diseases The principles of drug action and it use, and efficacy of varies therapies Normal & abnormal human behaviour Relevant biochemical, pharmacological, surgical, psychological, social and other interventions in acute and chronic illness, in rehabilitation, and end-of-life care.		The human body as a complex adaptive system: structure, function Homeostasis: Cellular, molecular, biochemical & physiological mechanisms Behaviour: normal & abnormal Genetics & inheritance Intelligence& memory	CVS Principles of drug action, use & efficacy External stimuli & body's responses (Gen path) Immune System Common pathogens Community Medicine	Resp Haemo GI Nutrition	Endo Repro Renal	Nervous system Musculo-skeletal Response to pain	6 weeks each: Paeds & child psychol Med. Surg. Fam Med	6 weeks each: O & G Psych: personality & CBT Ortho	2 weeks each: Ophthal. ENT Derm Clin Path/Forensic Med 4 weeks Fam. Med & care of elderly incl. behavioural changes in ageing Selective & Elective	4 weeks each: Paeds Med Surg O & G Rad & Anaes	4 weeks each: Paeds Med Surg O & G 2 weeks each: Psych & Ortho Emergency Med integrated in all posting
			Integrated in organ-system: ▪ Normal structure &function of organ systems, abnormalities of structure and function in disease ▪ Behavioural changes in illness, the sick role & seeking help ▪ Aetiology & natural history of acute illnesses & chronic diseases ▪ Response to injury and host defence system ▪ Common microbes & parasites ▪ Demonstrates understanding of how normal homeostatic mechanisms are alerted in diseases. ▪ Demonstrates understanding of the pathological and pathophysiological processes of various diseases. ▪ Use results of diagnostic tests (e.g. X-ray, CT Scan, MRI, ECG, double contrast, haemogram) to describe normal and abnormal structure, function and behaviour ▪ Demonstrates understanding of the mechanism of actions of drugs and how they reverse the pathological/physiological processes.				Integrated in the postings: ▪ Aetiology & natural history of acute illnesses & chronic diseases; ▪ Demonstrates understanding of the pathological and pathophysiological processes of various diseases. ▪ Appreciates that knowledge of the natural progression if the diseases help in diagnosis and in understanding future problems related to the disease. ▪ Demonstrates understanding of the mechanism of actions of drugs and how they reverse the pathological/physiological processes and be able to prescribe appropriate therapeutic interventions ▪ Understand the scientific basis of different types of intervention (other than pharmacological) biochemical, surgical, social, psychological intervention in acute, chronic illness, in rehabilitation and end of life care. ▪ Use results of diagnostic tests (e.g. X-ray, CT Scan, MRI, ECG, double contrast, haemogram) to make diagnosis and plan management			

Curriculum map linking competencies under various outcome domains to matrices & study guides by semesters :

Competency	Where addressed	Delivery tools	Assess-ment tools
1. Application of basic sciences in the practice of medicine **Phase 1** 1. Demonstrate knowledge of the normal structure and function of the body as a complex of adaptive biological system	Sem 1: Entire Foundation 1 Sem 2: All disciplines Sem 3: All systems i.e..Respiratory, Haematology & Gastro-intestinal system Sem 4: Endocrine, Reproductive, Renal Sem 5: Plenaries, PBL, (Medical Museum Sessions)	Sem 1: Lecture, PBL, AIR, MMS Sem 2: Lecture, PBL, Lab, Museum, rotations, CSU, Skills Lab & AIR. Sem 3: All done in PBL, plenary, lab sessions, microlab, pathlab, MMS, dry & wet lab sessions, rotations, CSU Sem 4: Plenaries, PBL Sem 5: Plenaries, PBL, MMS	**MCQ** **OSPE**
2. Demonstrate knowledge of the molecular, cellular, biochemical and Physiological mechanisms that maintain the body's homeostasis	Sem 1: Entire Found 1 Sem 2: All disciplines Sem 3: All systems ie. Respiratory, Haematology & GI Sem 4: Endocrine, Reproductive, Renal Sem 5: Plenaries, PBL, (Medical Museum Sessions)	Sem 1: Lecture, PBL, AIR, Dry & Wet Lab Sem 2: Lecture, PBL, Lab, Museum, rotations & AIR Sem 3: All done in PBL, plenary, lab sessions, microlab, pathlab, MMS, dry & wet lab sessions, rotations, CSU, Sem 4: Plenaries, PBL Sem 5: Plenaries, PBL, MMS	**MCQ** **OSPE** **SAQ**

Implementation

Curriculum delivery

Every teaching / learning activity- large group, small-group, class room-based, ward-based and even self-directed learning activities (for e.g. portfolio's) must be structured under the **exit outcomes**

Clerking sheet for portfolio case write up

LEARNING ISSUES IN THE 8 IMU OUTCOMES

Application of basic science
Clinical skills
Self directed life long learning & information management
Disease Prevention &health promotion
Professionalism, ethics and personal development

Family and community contexts of healthcare
Critical thinking and research
Communication skills

- Queries
- Answers:
- Source/s: _____ Date: _____

- Queries
- Answers:
- Source/s: _____ Date: _____

Curriculum delivery

- Curriculum map is useful to provide an overview of the course / posting
- Learning Guides- useful for students – for day to day management of information

"Outcomes monitors"

Useful to have an "Outcome Monitor" for the major outcome domains:

to oversee the vertical integration of the various skills / competencies

Teacher's role

Our main role today;

- Is it teaching?
- Is it in ensuring how much the students/ trainees have learnt?

Teacher's role

Changing roles – more of mentoring, facilitating, providing feedback etc

Approaches to Education

Traditional Learning Environments	New Learning Environments
Teacher-centred instruction	Student-centred instruction
Single media	Multimedia
Isolated work	Collaborative work
Information delivery	Information exchange
Passive learning	Active/exploratory/inquiry-based learning
Factual, knowledge-based	Critical thinking and informed decision making
Reactive response	Proactive/planned action

Approaches to Education

The Old Way

- Focus on the teacher
- Transmit,absorb, regurgitate (Passive)
- Content driven

The Newer Way

- Focus on the student
- Active/collaborative learning
- Community-based
- Student driven

Teacher's role

Teachers must play a role in consolidating and strengthening skills / competencies that have been acquired through **"self-directed learning", "Informal teaching / learning encounters" and "observations"**

Lesson from IMU

IMU implemented OBE since year 1999..

- Learning Guides
- Lesson Outcomes
- Curriculum Map

These are " living documents"
And must be revised periodically

Study Guides

An Example → Older version

Problem solving

- Understand the significance of associated symptoms of fever; e.g., chills, sweats, rigors
- Understand the complications of high fever as opposed to the complications of the underlying disease.
- Understand the concept of cost awareness in the evaluation of a febrile patient.

Family and Community context

- Understand commonly held beliefs about the causes and treatment of fever.

Personal development

- Appreciate patients and parents erroneous fear of short duration fever as a sign of serious disease (sensitive to patients and parents' concerns)

Action verbs

When developing / defining outcomes…

- Avoid vague / hidden / non-demonstrable processes:
  - Know
  - Understand
  - Believe
  - Think, etc

- Use "measurable and observable action verbs"
  - Describe
  - Explain
  - Discuss
  - List, etc.

Study Guides
An Example → Revised version

CLINICAL TOPIC: "Headache" / Skin Rashes / Chest pain

Task : Headache

Contents

Objective to be achieved in each of the 8 IMU Outcomes

Domain 1 **Application of basic sciences in the practice of medicine**

Students should e able to
- Explain the histology of skin.
- Discuss the functions of the skin
- Define the terminology in skin lesions: macule, papule, nodule, pustule, plaque, scale, cyst, wheal, ulcer

Domain 2 **Clinical Skills**

Management:
- Discuss the common drugs used in skin lesions
- List the various dermatological medicine preparation.
- Describe the side effects of topical steroid therapy.

Domain 3 **Critical thinking and research**

- Describe the molecular genetics associated with skin lesions.
- Discuss the evidence based approach and critical appraisal will help guide diagnostic and therapeutic decision making.

Outcome-based education

- Important to have continuing improvement initiatives based on feedback; from
  - students,
  - faculty
  - accreditation visits
  - etc.

"Students"

Involve students / trainees

in curriculum development and review

- "ownership" issue
- meets students needs
- increases effectiveness

Outcome-based education

- After every teaching / learning activity, faculty must make note of the gaps/ issues that are not relevant/ repetitive issues
- Institute necessary changes periodically

Outcome-based education

Adequate and dedicated time must be set aside in the curriculum to discuss student's experiences in different learning environment

A platform to discuss and develop some of the softer skills (related to the outcomes)

Revisit the questions

- What are the educational goal/s of the university?
- What kind of doctor do we want to produce?

  → consider what kind of doctor that we want to treat us / or our family member?

  → what competences should this doctor possess?

Outcome-based education

Exit Outcomes

Phase/ Semester/ Term Outcomes

Year Outcomes

Course / Module / Outcomes

Lesson Outcomes

Summary

- Broad exit outcomes & defined specific and measurable learning outcomes
- Faculty training / retraining
- Student's guidance / acceptance
- Periodic review

Conclusion

Benefits

- **Differing levels** of outcome specification is important. Akin to provision of a "roadmap" for learning
- Learning guides can be provided as a key resource -> Managing information overload
- **Assessment** process: choice of appropriate tool/s
- OBE aims to make the curriculum clear (to students as well as all stake holders) -> Being accountable

Acknowledgement

Center for Medical Education (CtME),
International Medical University,
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Thank you for your attention

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Annual event: International Medical Education Conference
in Kuala Lumpur (held end March/April)
→ 1st-3rd April 2009 (imec2009@imu.edu.my)
www.imu.edu.my