ورشة عمل

Assessment in medical education

المكان:- المدرج

يوم ٦/١٢/٢٠٢٠م

Ahmad Makhlouf

Former dean of Assuit faculty of medicine
Professor of obstetrics and gynecology, Assiut University
Current director of medical education development Centre, Assiut University
Current Board Member of the Planning Committe, Medical Sector
Supreme Council of Universities
Current Board Member of the Egyptian fellowship of obstetrics and gynecology higher committee
Current expert and reviewer at the National Agency of Quality Assurance and Accreditation
Current member of National Committee for Reform of Medical Education
Current supervisor of undergraduate medical programs in Upper Egypt universities

How can we be sure that an assessment is good

Assessment in Medical Education: An Overview

- **"Assessment Drives Learning"**
- This classic statement by George E. Miller (1919-1998) encapsulates in a single phrase the central role of assessment in any form of education.
- Particularly in medical education where the stakes are high, it is impossible to overstate the importance of assessment.

Key concepts of assessment

1- Purpose of Assessment

(Why Assess?)

Stakeholders and their questions regarding purpose of assessment

Stakeholders	Questions	interest
Medical student	• Have I achieved competence? • How can I do better?	• Competency judgment • Support of learning
Medical teacher	• How successful was my teaching? • How can I do better?	• course validation • course improvement
Medical school, Professional body and public (consumer)	• Are we producing safe doctors? • Are we teaching the right things? • Are we teaching in the right way? • Is the money worth spending?	• Certification and licensing • Program justification • Curricular modifications • Curricular improvement

Assessment types and their characteristics according to purpose/stake

Feature	Low Stake	Medium Stake	High Stake
Examples	Formative assessment	• Continuous assessment (CA), • Mid term • end of posting test; • house officer evaluation	• Summative assessment(end of block, year, stage) • Professional Examination,
Decisions and consequences	Few, easily reversible decisions, low consequence	Decisions can be reversed	Decisions are generally irreversible, consequences high
Developmental effort needed	Low	Medium	High

Assessment types and their characteristics according to purpose/stake

Feature	Low Stake	Medium Stake	High Stake
Quality assurance	Seldom needed	Recommended	Required
Monitoring and implementation	Individual level	Departmental level	Central; national or medical school level
Check for validity and reliability	Not routinely required	Recommended	Required
tools	essay question	MCQ, VSAQ	Case based MCQ, VSAQ
tools	Traditional long case	WPA portfolio	Multi-station OSCE

Criteria of good assessment

- **Validity**
- **Reliability**
- **Accountability**
- **Flexibility**
- **Comprehensiveness**
- **Feasibility**
- **Timeliness**
- **Relevance**
- **Criterion-referenced assessment**
- **Objectivity**
- **Educational**
- **Fairness**

Criteria for "Good" Assessment

Validity:

- Does the test measure what it is supposed to measure?

✓ Blueprinting against competencies/e,g *NARS*

✓ An assessment is valid if it adequately measures whether the knowledge, skill, and attitude objectives/outcomes of the course have been met.

Criteria for "Good" Assessment Validity:

Does the test measure what it is supposed to measure?

To check the validity of an examination, ask the following questions:-

- Does the assessment reflect the course objectives? :can test items be traced back to the ILOS/ for the course?
- Does the assessment cover the content in a representative manner? does the combination of methods address the content in a comprehensive manner?
- Do the test items have the appropriate balance? :25 percent of the course time on one course objective=25 percent of the assessment .
- Is the assessment method appropriate for the type of objective?

Knows Knows how Shows how does

Criteria for "Good" Assessment

RELIABILITY

- *Does the test produce consistent results?*

- A reliable assessment should obtain similar results if the same students take the exam more than once.
- For example, if a student scores 80 percent the first time taking a written test, the student should achieve a similar score on retaking the test shortly thereafter.
- In addition, a reliable assessment should obtain similar results when different observers or examiners assess the same student.

Relationship between Validity and Reliability

- Reliability and validity are closely linked.
- Reliability is a necessary prerequisite of a valid test.
- Validity is severely compromised in an unreliable test.
- Conversely, a test can be highly reliable (consistent) without being valid.

Other criteria of good assessment

- **Accountability**
- **Flexibility**
- **Comprehensiveness**
- **Feasibility**
- **Timeliness**
- **Relevance**
- **Criterion-referenced assessment**
- **Objectivity**
- **Educational**
- **Fairness**

Accountability	• **Ensure Stakeholders include students, clinical educators, the program and institution, licensing bodies and ultimately the community that the clinician will serve.** • **To facilitate accountability an assessment must be defensible and able to provide a logical analysis or explanation of results.**
Flexibility	**the chosen assessment method must allow the examiner to evaluate the complete clinical spectrum of the content domain in question multiple times and in multiple settings.**
Comprehensiveness	**an assessment will evaluate all pertinent objectives for the course**
Feasibility	**An assessment should be portable, cost-effective, practical, and limit physical and human demands.** **Reality checks, for example through feedback from assessment, organizers, examiners and candidates** **- Logging of practical problems that arise** **- The affordability and proportionality of the overall assessment process**

Timeliness	**If documentation is delayed, assessment is less effective as a learning tool, more subject to bias, and less defensible.**
Relevance	**The results of assessment, favorable or not, must be used to facilitate learning and influence promotion and curriculum planning decisions.**
Criterion-referenced assessment	**The student is being tested against predefined performance criteria and not against other students.**
Objectivity	**Free of teacher bias.** **Objective tests are preferred (for example, MCQs rather than open-ended questions or essays)** **Objectivity can be increased, by using scoring aids such as skills checklists, model answers to questions**

Educational	**An educational strategy that covers the impact effects of assessment for example on students' learning priorities and incorporates reviews of assessments in this light** **- A structured approach to formative assessment and feedback** **- Instilling in students a commitment to lifelong learning and reflection**
Fairness	**Monitoring of student outcomes assessors in respect of equality and diversity** **- Action being considered and taken as appropriate including reasonable adjustments for disability or changes to items in regard to cultural sensitivity** **- Annual reports on assessment with monitoring data and summaries of action considered and taken.**

What Is A Good Assessment?

- $U = R \times V \times E \times C \times A$ Van der Vleuten
  - *U - Utility*
  - R – Reliability
  - V – Validity
  - E – Educational Impact
  - C – Cost
  - A - Acceptability

What Is A Good Assessment?

- $U = R \times V \times E \times C \times A$

Van der Vleuten

- *U - Utility*
- R – Reliability
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- A - Acceptability

How about an MCQ?

What Is A Good Assessment?

- $U = R \times V \times E \times C \times A$

Van der Vleuten

- *U - Utility*
- R – Reliability *(Good)*
- V – Validity *(Fair)*
- E – Educational Impact *(Fair)*
- C – Cost *(Good)*
- A – Acceptability *(Reasonable)*

How about an MCQ?

❑What to assess

❑Assessing against competencies /outcomes

1- All the "competencies of NARS for graduates" will be assessed at appropriate points during the curriculum, ensuring that only students who meet these competencies are permitted to graduate.

2- What should be assessed

- The graduate as a health care provider.
- The graduate as a health promoter.
- The graduate as a professional.
- The graduate as a scholar and scientist.
- The graduate as a member of the health team and a part of the health care system.
- The graduate as a lifelong learner and researcher

3- The same applies to competencies/capabilities in practice for postgraduates programs

❑ What to assess :Assessing against competencies /outcomes (to be continued)

4- Blueprinting:

- **aims to ensure that the defined curriculum (and only that) is assessed**
- **ensures that a reliable sample of the curriculum is selected for testing**
- **enables the most appropriate test methods to be used for the different aspects to be tested**

5 - Before blueprinting, each course, module or rotation will develop competencies derived from standards (e.g NARS) then learning objectives (topic by topic) outlining what the student will have learned/be able to do upon completion of the course, module or rotation. As follows

1. **Define standards (e.g NARS) Competencies for each block/course**
2. **Define block/course sub Competencies/ILOS matched with standards (e.g NARS)**
3. **Define Topic/Session learning Objectives matched with block/course sub Competencies/ILOS**
4. **Matche between standards (e.g NARS) Competencies for each block/course (or Program ILOs, Courses ILOs) and Blue print.**

Example of course/module/block matrix

NARS(competencies)	Sub competencies					
	ILOS K*	ILOS I*	ILOS C	ILOS D	Core Cases	Topic/learning objectives

- You can have both ILOS K and ILOS I in one column.

Outline grid of progress expected for clinical CiPs in a postgraduate curriculum

- **Level descriptors for clinical CiPs**
- Level 1 - Entrusted to observe
- Level 2 - Entrusted to act under direct supervision
- Level 3 - Entrusted to act under indirect supervision
- Level 4 - Entrusted to act independently with support
- Level 5 - Entrusted to act independently

Outline grid of progress expected for clinical (capabilities in practice) CiPs in a postgraduate curriculum

CiPs (short title)	Years/rotations and levels					
	Year/rotation 1	Year/rotation 2	Year/rotation 3	Year/rotation 4	Year/rotation 5	Year/rotation 6
Developing the doctor - Generic CiPs						
Developing the specialist e.g obstetrician and gynaecologist- Specialty CiPs						

Outline grid of progress expected for clinical CiPs in a postgraduate curriculum

CiPs (short title)	Years/rotations and levels					
	Year/rotation 1	Year/rotation 2	Year/rotation 3	Year/rotation 4	Year/rotation 5	Year/rotation 6
Developing the doctor - Generic CiPs 1. Clinical skills and patient care 2. Working in health organizations 3. Leadership 4. Quality improvement 5. Human factors 6. Developing self and others 7. Innovation and research 8. Educator						

Outline grid of progress expected for clinical CiPs in a postgraduate curriculum

CiPs (short title)	Years/rotations and levels					
	Year/rotation 1	Year/rotation 2	Year/rotation 3	Year/rotation 4	Year/rotation 5	Year/rotation 6
Developing the doctor - Generic CiPs						
Developing the obstetrician and gynaecologist- Specialty CiPs						
9. Emergency gynaecology and early pregnancy 10. Emergency obstetrics						

Outline grid of progress expected for clinical CiPs in a postgraduate curriculum

CiPs (short title)	Years/rotations and levels					
	Year/rotation 1	Year/rotation 2	Year/rotation 3	Year/rotation 4	Year/rotation 5	Year/rotation 6
Developing the doctor - Generic CiPs						
Developing the obstetrician and gynaecologist- Specialty CiPs 11. Non-emergency gynaecology and early pregnancy 12. Non-emergency obstetrics						

Outline grid of progress expected for clinical CiPs in a postgraduate curriculum

CiPs (short title)	Years/rotations and levels					
	Year/rotation 1	Year/rotation 2	Year/rotation 3	Year/rotation 4	Year/rotation 5	Year/rotation 6
Developing the doctor - Generic CiPs						
Developing the obstetrician and gynaecologist- Specialty CiPs 13. Non-discrimination and inclusion 14. Health promotion						

Outline grid of progress expected for clinical CiPs in a postgraduate curriculum

CiPs (short title)	Years/rotations and levels					
	Year/rotation 1	Year/rotation 2	Year/rotation 3	Year/rotation 4	Year/rotation 5	Year/rotation 6
Developing the doctor - Generic CiPs						
Developing the obstetrician and gynaecologist- Specialty CiPs						

Preparation of a Blueprint:

1. Define the scope and purpose of assessment
2. Decide the weightage to be given to content areas, domains of learning and methods of assessment.
3. Decide the total weightage and number of items to be included in the assessment
4. Decide on the table of test specifications
5. Prepare individual questions

❑ Blueprint for each block/course:

Codes Of NARS	codes of ILOs tested	topic learning objectives	Weight of each outcome/ topic in teaching	weight of each in the total assessment (% from the total mark)	Written Midterm objective	Written Midterm essay	Practical midterm	portfolio	Practical final	Written final objective	Written final essay

Quality assurance for Content

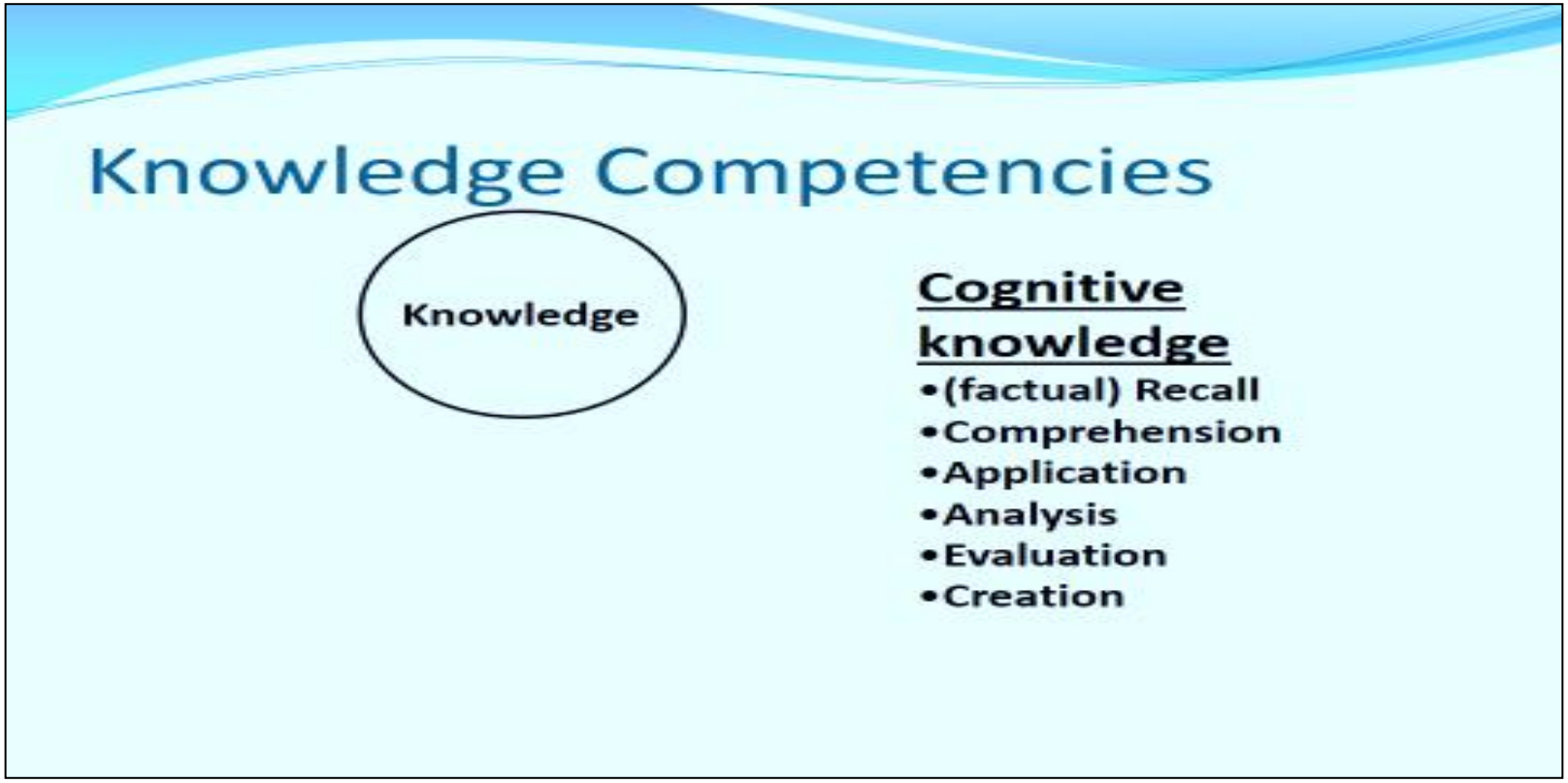
- **What Competencies/ domains you identified**
- **What is the Blue print**
- **How did you decide test format**

A Model for Assessment

- **Matching Assessments to Learning Outcomes/competencies:**

❑ Matching Assessments to Learning Outcomes/competencies:

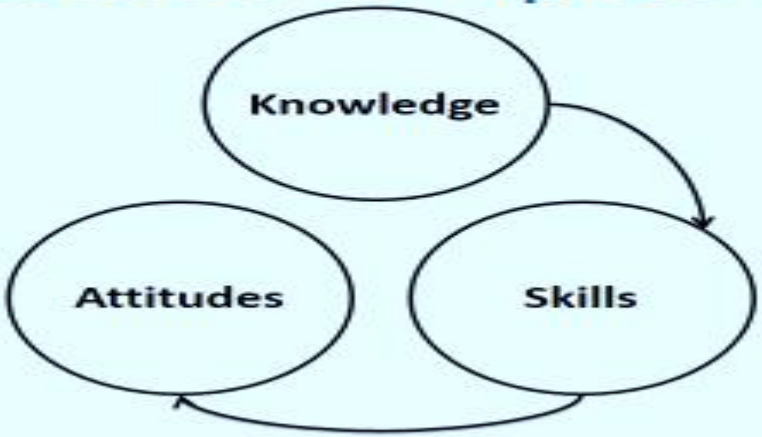
- **Cognitive: mental skills (Knowledge) K**
- **Psychomotor: manual or physical skills (Skills) S**
- **Affective: growth in feelings or emotional areas (Attitude/bahaviour) A**



Skill competencies

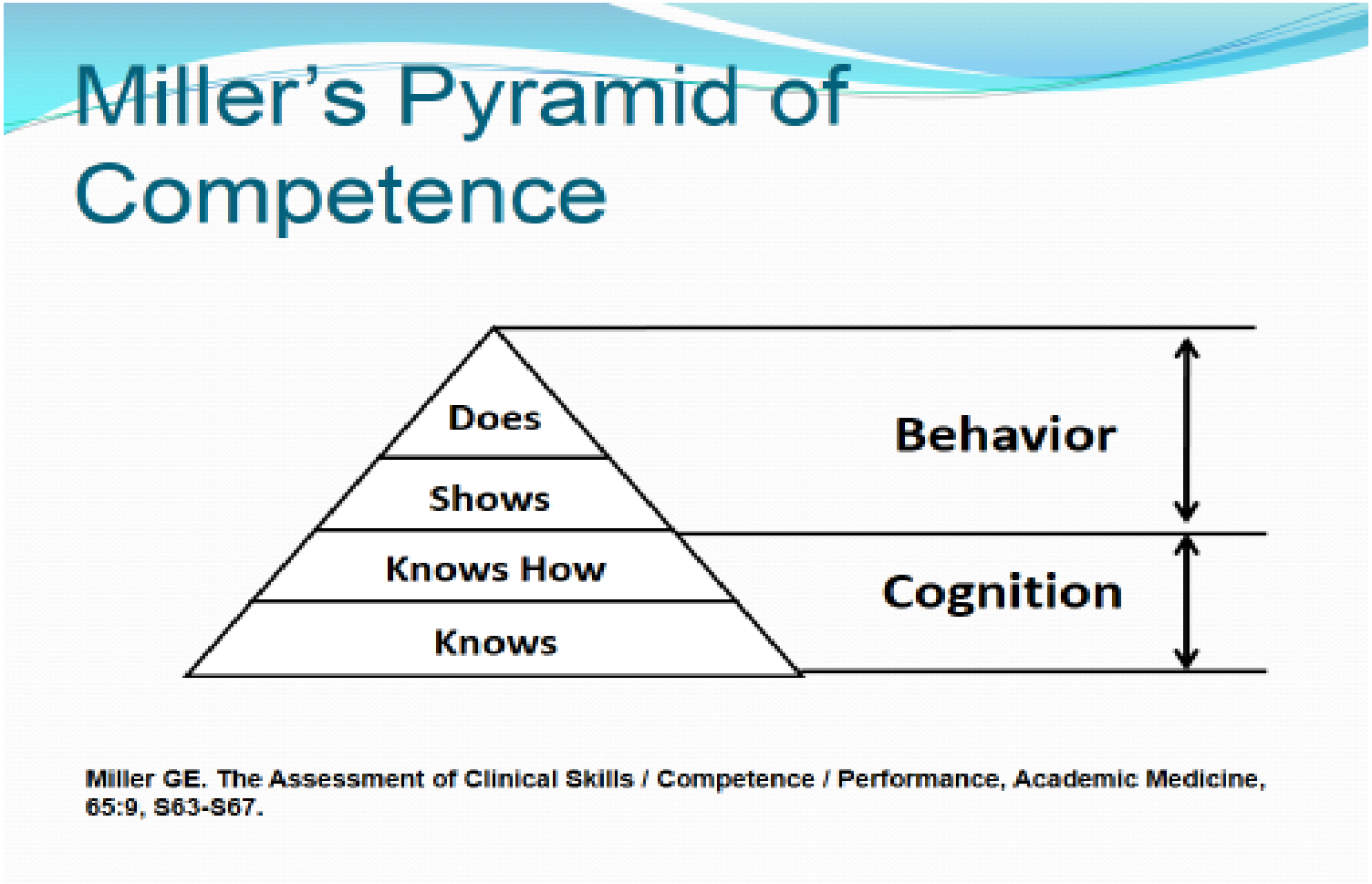
Skills
- Communication
- History taking
- Physical Exam
- Procedures
- Informatics
- Time Management
- Problem Solving

Attitude competencies

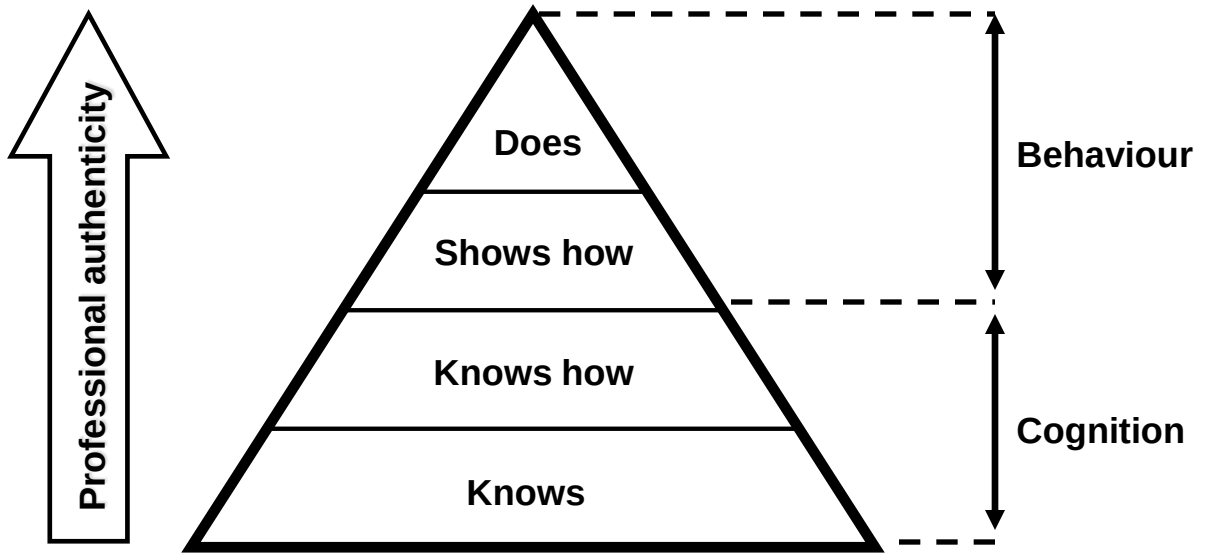


Attitudes
- Behavior
- Self Learning
- Teamwork
- Professionalism
- Key Personal Qualities
- Motivation

Use of Miller's Pyramid to
select Assessment Tools and Methods:-

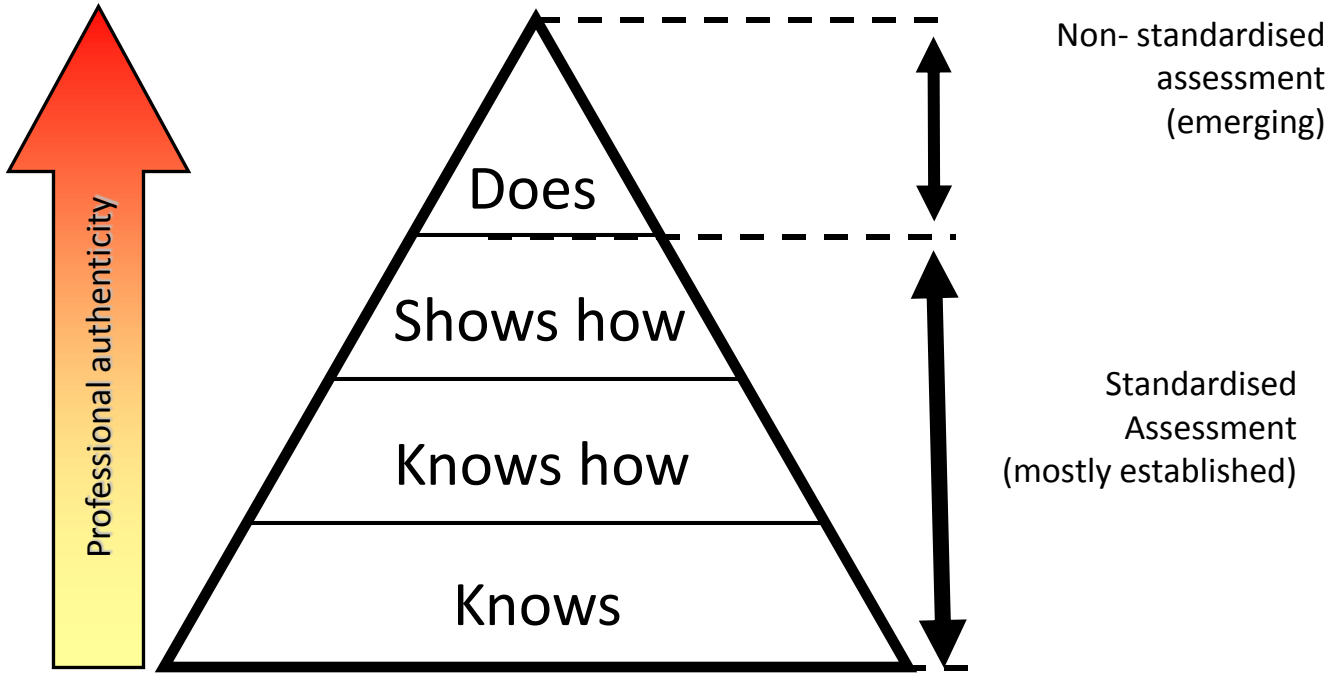


AUTHENTICITY/Domains OF CLINICAL ASSESSMENT – MILLER'S PYRAMID



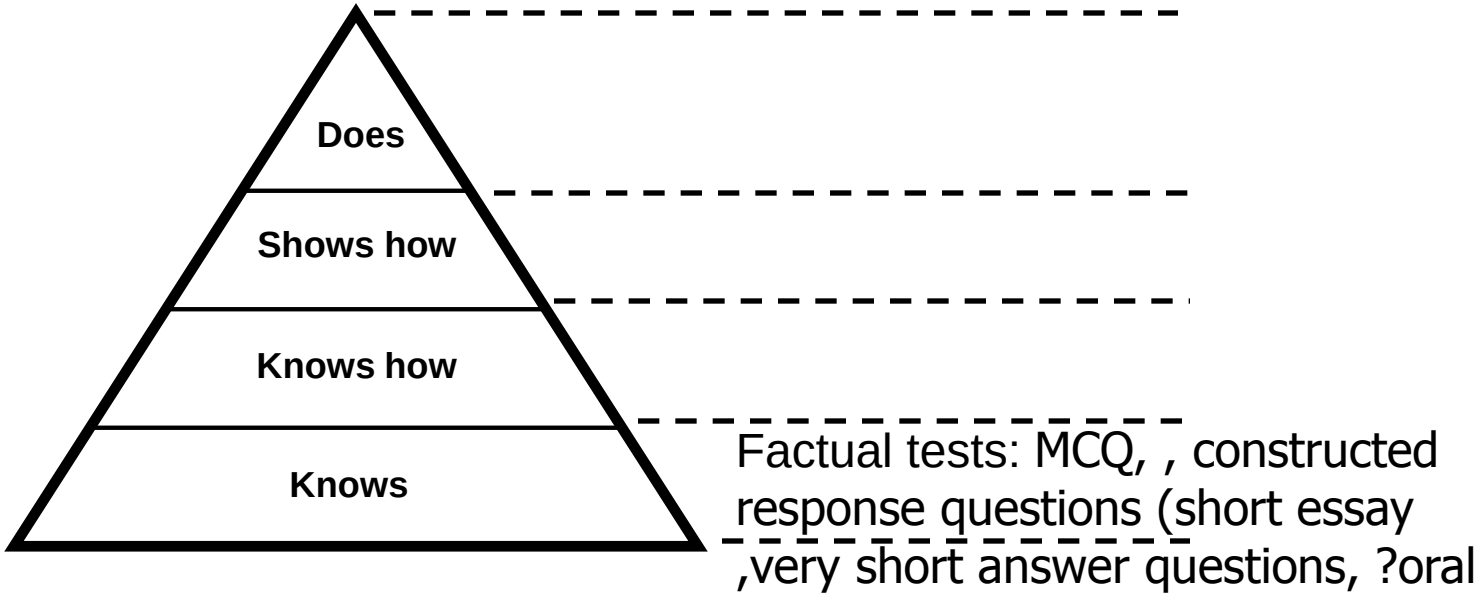
Miller (1990)•

Miller’s pyramid

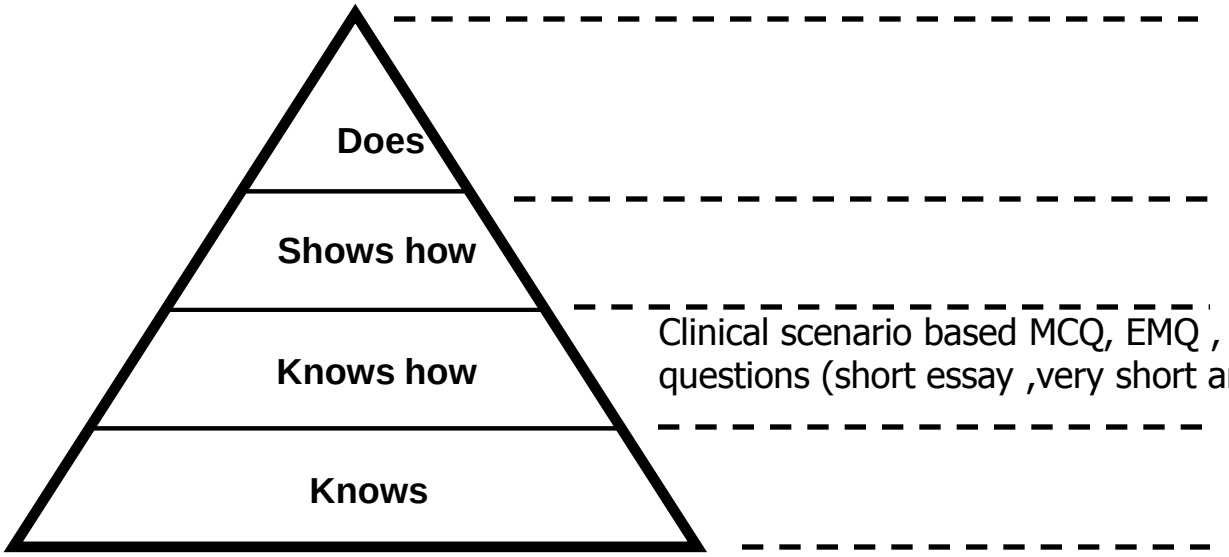


Miller GE. The assessment of clinical skills/competence/performance. Academic Medicine (Supplement) 1990; 65: S63-S7.

MILLER'S PYRAMID – 1990



MILLER'S PYRAMID – 1990



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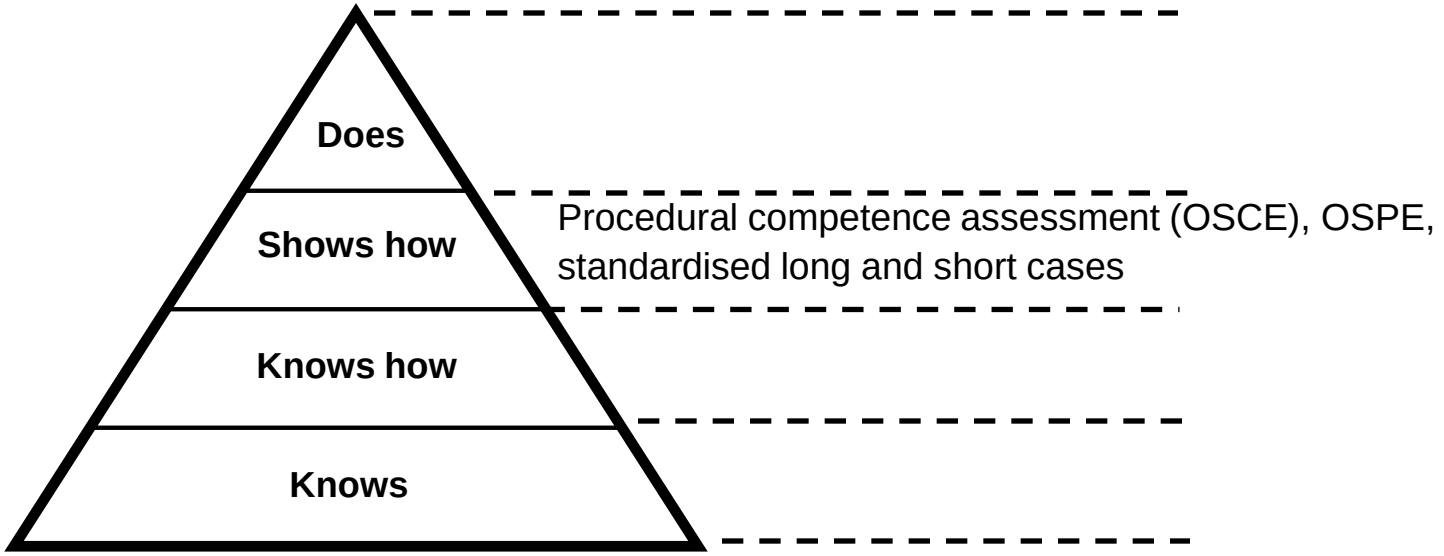
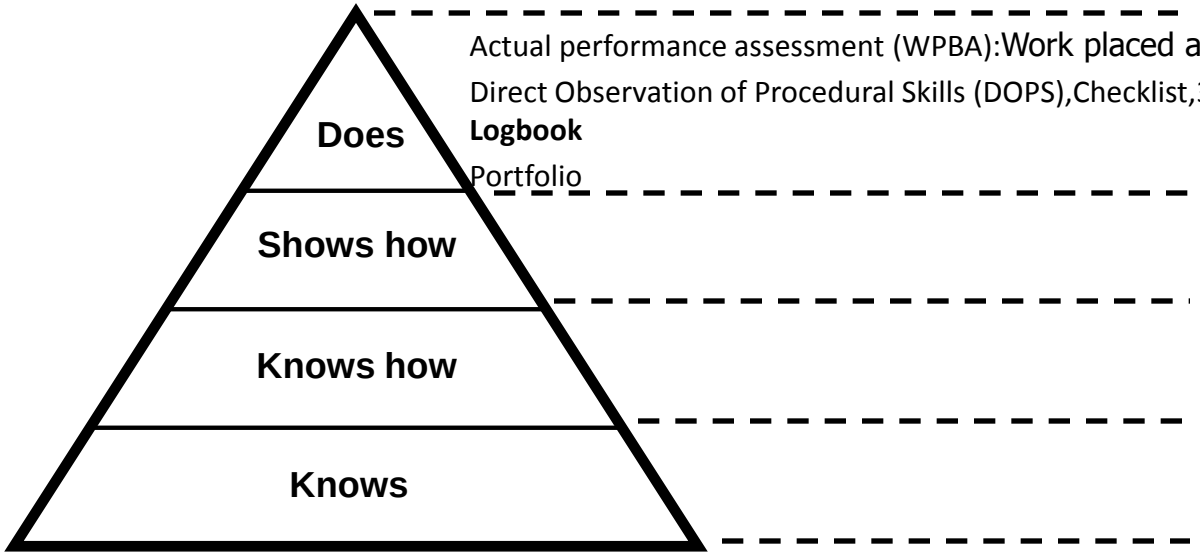
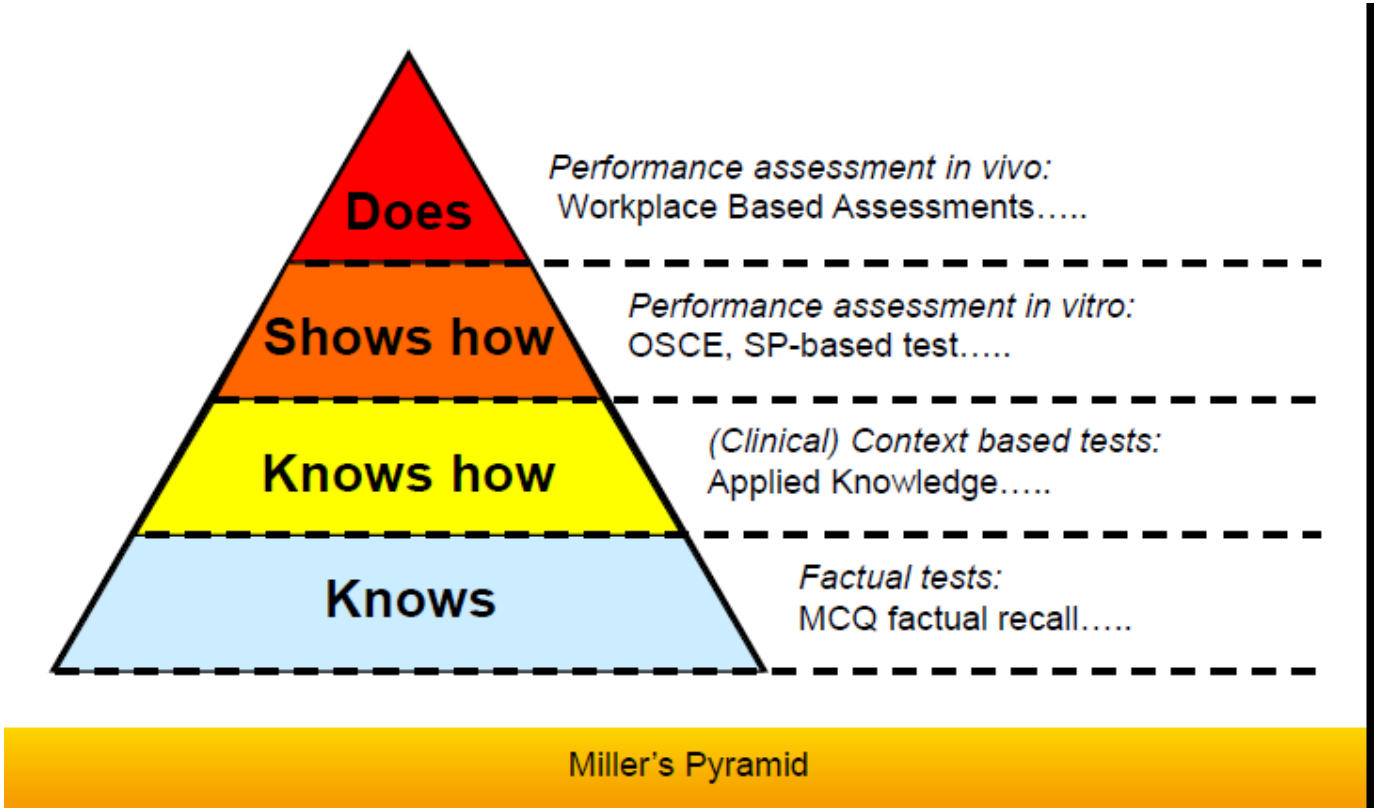


MILLER'S PYRAMID – 1990




Does
Shows how
Knows how
Knows
Performance assessment in vivo:
Workplace Based Assessments…..
Performance assessment in vitro:
OSCE, SP-based test…..
(Clinical) Context based tests:
Applied Knowledge…..
Factual tests:
MCQ factual recall…..
Miller's Pyramid

Recommendations for Better Practice

- Assessment should be designed prospectively along with learning outcomes
- Assessment methods must provide valid and usable data
- Assessment methods must yield reliable and generalizable data
- Assessment should be driven by the purpose in mind
- Multiple assessment instruments targeting all levels in Miller's pyramid are necessary to capture a reasonable breadth of competency
- Content validity is best achieved by a proper blueprint of learning outcomes
- Students need to be tested with multiple cases and scenarios to achieve an acceptable degree of reliability
- For summative assessment, the standard of the examination should be based on criterion-based referencing

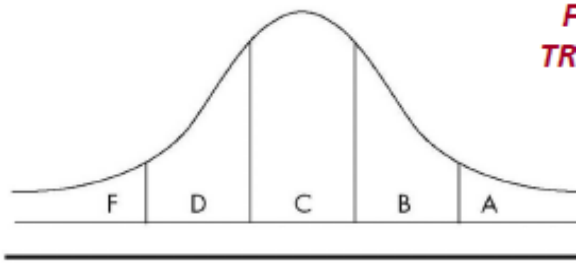
GRADING CRITERION REFERENCED
Use criterion-referenced grading to assess competence

NORM-REFERENCED GRADING

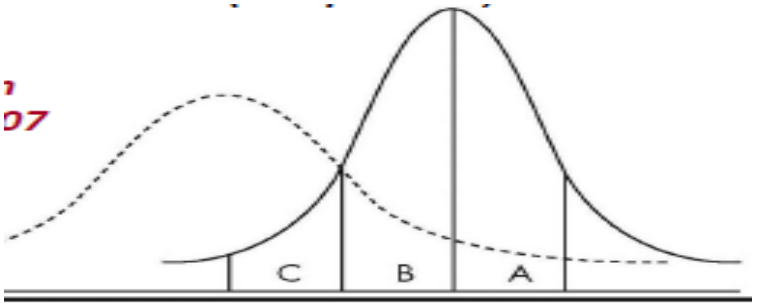
Comparison to other learners

CRITERION-REFERENCED GRADING

Comparison to fixed standards (competence)



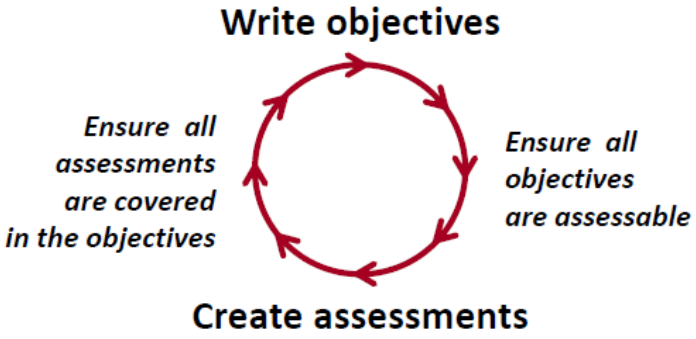
Traditional curricula have norm-referenced distribution of achievement



Mastery-learning curricula have criterion-referenced distribution of achievement

In criterion-referenced grading, the director predetermines standards for grades & the curve is shifted to the right, but there are still high, average

ALIGNMENT OF CURRICULUM
Continuously compare objectives & assessments and rewrite as necessary to ensure alignment



ALWAYS write objectives with assessments in mind.
ALWAYS write assessments with objectives in mind.
ALWAYS link teaching to assessments ("teach to the test").

thanks!

Any questions?

Assuit University Medical Education Development & Training Center

كلية الطب– جامعة أسيوط
مركز تطوير التعليم الطبي والتدريب

تسجيل حضور

ورشة عمل Assessment in medical education ٢٠٢٠/١٢/٦

م	الإسم	القسم/الجامعة	البريد الإلكتروني	رقم التليفون	التوقيع
	أ.م.د/ أحمد صلاح الدين عامر	التشريح/ طب أسيوط	amer1@marshall.edu	٠١٠٦١٤٦١٣٤٢	[signature]
	د. أسماء محمد إسماعيل محمد	الأطفال/ طب أسوان	a_esmail dr@yahoo.com	٠١٠٦٣٤٨٠٥٣٠	د. أسماء إسماعيل
	أ.د. مصطفى محمود مهدي	الفارماكولوجي	moustafam 61@hotmail.com	٠١٠٠٦٦٤٤١٠١١	[signature]
	د. صفاء علي مهران	روماتيزم وتأهيل	safaa69@yahoo.com	01003385106	[signature]
	د. نسرين محمد عبد الرحمن	فسيولوجي	drnessren82@yahoo.com	01003248010	د. نسرين
	أ.د. كوثر محمد	هستولوجي	Kawther_1110@yahoo.com	٠١٢٢٨١١٧٤٤	كوثر محمد
	د. فاطمة يس	هستولوجي	fmeligy@gmail.com	٠١٥١٩٠٠٦٠٨	فاطمة يس
	د. صفاء مصطفى	هستولوجي	[illegible]	[illegible]	صفاء مصطفى
	د/ ابتسام سيد عبد الكريم	صدرية	ebtsam sayed 46@yahoo.com	٠١٠١٥٦٢١٤٠٩	ابتسام سيد
	د/ [illegible]				
	د. سمر حسنين [illegible]	روماتيزم وتأهيل	samarhassanein 2010@yahoo	[illegible]	[signature]

E-mail: medtc@yahoo.com (ب) جامعة أسيوط –كلية الطب – الدور الخامس – الجناح
☎ : ٠٨٨/٢٤١٣٦٨٣