REFORMS IN THE ASSESSMENT OF MEDICAL UNDERGRADUATE STUDENTS

Abstract

The assessment system in medical undergraduate education in India is witnessing change with the recent introduction of Competency-Based Medical Education (CBME) and National Education Policy 2020 (NEP-2020). This paradigm shift is comparable with the world wherein the emphasis is now on creating the Indian Medical Graduate IMG who can act not only as a clinician but also as a leader, communicator, professional and lifelong learner. Such reforms focus on formative and longitudinal assessments, student-centred learning, integrated clinical exposure, and a transition from rote memorization to competency-based learning.

The article retraces the Frameworks [for example, Bloom's taxonomy, Miller's pyramid, Dreyfus and Dreyfus's stages in skill acquisition, RIME model and Entrustable Professional Activities (EPAs)] that have informed the structuring of assessments. These frameworks promote evaluation of knowledge, technical skills as well as professional behaviour in authentic settings. The integration of cognitive, affective, and psychomotor domains is necessary for achieving meaningful learning outcomes.

The monograph highlights the shift in assessment - no longer confined to measurement through scores but involves informed judgments and developing systemic evaluations. The introduction of tools such as OSCE, Mini-CEX, DOPS, and Portfolios reflects this shift. Workplace-Based Assessment (WPBA) approaches, feedback loops, and programmatic assessments are being increasingly employed to support ongoing learning and encourage reflection in practice.

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The CBME has been implemented across the country in India, However the system of assessment is still largely summative and internal assessments are contributing marginally towards the final certification, limiting their formative value. The adoption of EPAs and effective formative assessment tools remains inconsistent. Faculty development, creation of validated question banks, psychometric analysis of assessment tools, and integration of technology are recommended to support this transition.

In conclusion, India's adoption of CBME marks a paradigm shift in medical education. However, successful implementation of assessment reforms requires structural, procedural, and cultural changes within medical institutions.

I. IMPORTANCE AND RELEVANCE

With the introduction of CBME and NEP, the years 2019 and 2020 have seen major policy decisions in the field of education in India. Both policies aim to transform medical education and higher education through institutional restructuring, a holistic and multidisciplinary approach to education, optimal learning environments and student support, changing the culture of assessment through continuous, formative assessments, and transforming the regulatory systems. [1, 2]

Competency-based education uses objectives mapped to the framework of competencies to know the outcome of medical education training [3]. Assessment focuses on the phase subject (sub) competencies, which are in turn mapped to the global competencies in the graduate medical education regulations. The Indian Medical Graduate [IMG] is expected to function in the roles of a clinician, leader, communicator, lifelong learner and the professional. Since in CBME, achieving of competency is the end point of educational process, it needs ongoing continuous, contextual assessments with the formative feedback for learners to know the progress and achievement of expected competencies. NEP-2020 also focuses also on formative and competency-based assessment, promoting learning and development of students and testing higher-order skills.

As India is shifting from traditional medical education to CBME, rest of world is moving to the integrated curriculum, spiral integration and authentic assessments in work places using EPA as framework.[4]

In view of these major changes implemented in India, in the field of higher education specially the medical education, this article aims to trace the changes in the assessment approaches, tools which shaped the reforms of present day and what are the changes that Indian medical undergraduate curriculum assessment has incorporated in comparison to other countries.

II. BRIEF HISTORY

1. Global Scenario

Undergraduate medical training traditionally, involved initial pre-clinical, subject-based courses and a subsequent clinical component of patient care and management followed by supervised clinical practice in the form of internship or residency. [5,6]

Flexner's report marks the beginning of reforms in medical education by identifying the loopholes as lack of standardization in curricula, lack of connect between curriculum and clinical experiences and differences in student achievements and unqualified faculty [7]. To curb differences in student achievements, accreditation process for medical schools and matching of learning outcomes through assessment of competencies was recommended by Carnegie Foundation for the Advancement of Teaching in 1910 [8].

Osler's recommendation of bedside teaching and direct training by faculty in real patient context was guided by principles suggested by Flexner [9].Achievement of Competencies in authentic settings was primary to inter-professional education and teamwork, formal explicit training in ethics, assessment on professionalism and student support through mentoring and advising, feedback, reflective opportunities [10]. General professional education of the physician (GPEP) Report (1984) stressed on importance of purpose of clinical education and developing criteria for evaluation and supervision. It is recommended to reassess the importance of clinical practice to help medical students master the basic skills of medicine before graduation. These include clinical observation, interviewing, physical examination, and problem-solving skills [11].

The Edinburgh declaration was the final document of the world conference on medical education held in Edinburgh from August 7 to 12, 1988, suggested to build both curriculum and examination systems to ensure the achievement of professional competence and social values [12]. Initial implementation in post- Flexner reform involved integration across basic and clinical sciences. Health care delivery had changed drastically over past 20 -30 years owing to changes in social determinants of health, inequities in care, changing trends of non-communicable, life style related chronic health care needs. This led to medical education to see the health care as a changed system aimed to achieve patient safety, patient-centered, team-based services [13-15]. So, the curriculum content constituting health systems science was a new addition to medical education with equal importance as basic and clinical medical sciences [16-20] demanding training as integrated curriculum across time and across disciplines [21, 22].

2. Indian Context

Different committee worked post-independence in India from 1943 to 2020 to ensure the need-based changes in medical education. Initial committee reports focused on needs of larger section of society, provision of basic Infrastructure, rural health care needs, control of infectious diseases and social security [23].

Bhore committee, introduced 3 months of social and preventive medicine into the medical curriculum and aimed for strengthening primary health centres in rural areas, public health

reforms related to provide preventive, curative and rehabilitative services to entire urban as well as rural population. Health education was focus of Shrivastava committee (1975) and Bajaj committee (1983). National education policy of 1986 emphasised on setting up autonomous colleges and universities and establishing equity in weaker section of society through scholarships & incentive schemes, residential schools and hostel facilities [24].

In terms of assessment in undergraduate medical education, Recommendation of Radhakrishnan commission (1948-1949) was reform of assessment- "if there is one thing to be reformed in education, it is the examination system" [23]. National policy on education (NEP) 1968 recommended a shift in the focus of evaluation from certification to improvement in learning, NEP 1986 suggested elimination of excessive element of chance and subjectivity, ed-emphasizing memorization, introduction of continuous and comprehensive evaluation (CCE), use of grades in place of marks and introduction of semester system from secondary 2 stage in a phased manner. [24]

Today, the New Education Policy 2020 (NEP-2020) brings a change in assessment with a focus on regular, standardized, and effective assessments and testing high intelligence for student learning and development [1].

The transition is expected from a discipline- and knowledge-based curriculum to an integrated, system- and competency-based one. Key changes include in the curriculum of competency-based medical education [CBME] include vertical and horizontal curriculum integration; student-centred approach, small group teaching, explicit teaching-learning activities related to attitude, ethics, communication, and professionalism [AETCOM], early clinical exposure and inclusion of community-based practice; self-directed learning demanding more of formative and performance-based assessment; and just-in-time faculty feedback to improve [25].

III. ORIGIN AND INITIAL EXPERIENCE

1. Trends in the Assessment Frameworks

Education is defined as a continuous process, that brings about desirable changes in the behaviour of learners on a relatively permanent basis by way of increasing knowledge, improving skills, and developing attitudes/values/communication [26]. These desirable behavioural changes in education are called the objectives /specific learning objectives. Education, seen as a system aims at "Constructive alignment" of the objectives, process of teaching-learning activities, and output as summative student performance [27], which corresponds to Tyler's rationale of education - viz educational purpose, organization of educational experiences to attain purpose and determination of attainment of purpose [28]. The outcome of this entire process is seen in evaluation which can serve as feedback to all stages.

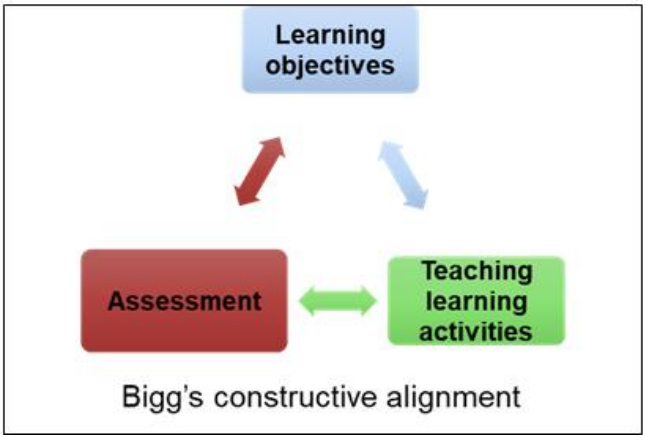

Figure 1: Constructive Alignment

To evaluate student performance objectively, Bloom and his associates proposed to classify the educational objectives in a hierarchical progression of three domains [29-31]. [Cognitive domain by Bloom et al 1956, psycho-motor domain by Simpson et al 1972, affective domain by Krathwohl et al 1973]

The educational objectives in Bloom's taxonomy were classified in domains and arranged progressively from simpler to complex stages.

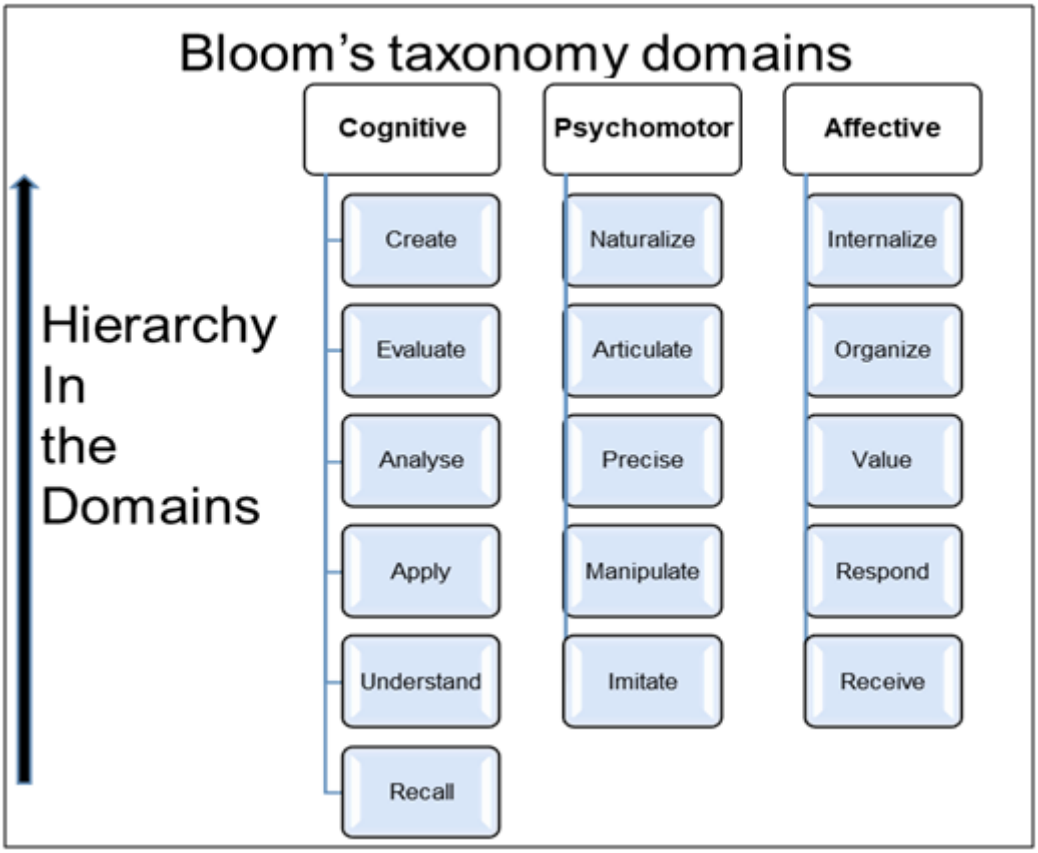

Figure 2: Bloom's taxonomy

It served as a framework for selecting the appropriate Teaching – learning Methods and Medium, by mapping the learning objectives on the continuum of learning. Bloom's taxonomy also served to identify the relevant level of assessment tools in medical education by deconstructing competence into individual domain-specific objectives. By being specific, measurable, attainable, relevant, and time-bound – Specific learning objectives [SLOs] served to the objectivity and reliability of assessments. A similar simpler framework of three levels of progression for each domain was proposed by Guibert [32].

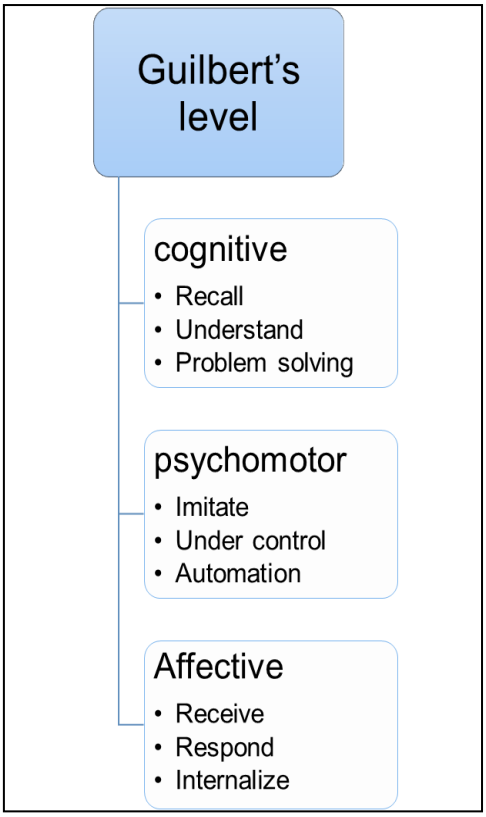

Figure 3: Guilbart's taxonomy

But successful performance in individual domains does not mean that student will be able to integrate all domains in practice and this framework misses the workplace setting of assessment for achieving professional competence.

Gorge Miller's pyramid [1990] suggested a layered framework at different levels- knows, knows how, shows how and does - which suggest the importance of cognitive component underlying the skills and difference in performance under standard setting [shows how] and real situations [does] refer as a skill and competency respectively [33].

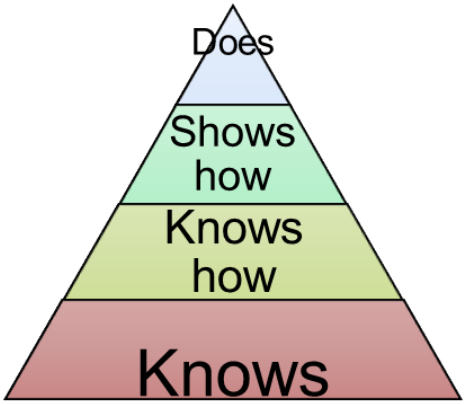

Figure 4: Miller's pyramid

A similar approach was described by Pangaro 1999 [34] as the RIME model for clinical settings in medical education included roles as Reporter, Interpreter, Manager, and Educator, which reflect stepwise professional activities in clinical settings and patient care as - accurate and relevant clinical information gathering, interpreting clinical findings, developing diagnostic and therapeutic plans, self-improvement and guiding the sub ordinates.

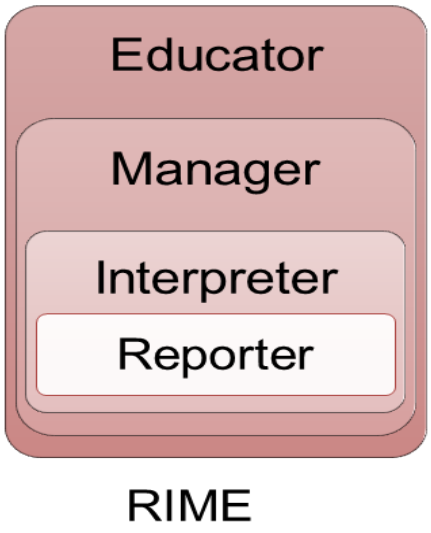

Figure 5: RIME model

In this framework, the professional keeps performing the roles of the lower level even if he is moving to higher roles. In this aspect, this model differs from developmental frameworks, in which the professional roles do not fall back once achieved /progressed to the next level as in Dreyfus and Dreyfus's model [35] shown below.

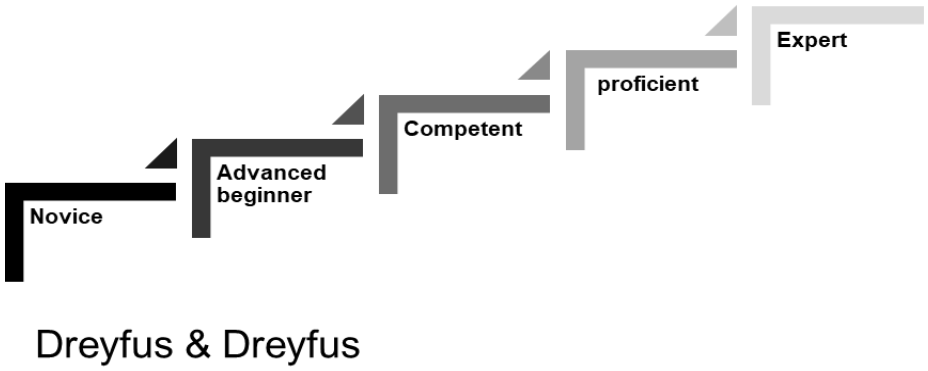

Figure 6: Dreyfus and Dreyfus model of competency acquisition

In this model, learning is mapped on a longitudinal timeline for achieving expertise. This has five stages of learning as novice-advance beginner-competent-proficient-expert. In beginner phase, students follow established rules and plans, as they have little or no experience. An advanced novice stage refers to limited "situational awareness." They can formulate general principles but have no holistic understanding. They try to complete the task but have trouble solving the problem. Competent and proficient can develop and work with conceptual domain models. Activities converge against the background of information accumulation. They can solve new problems and effectively seek expert advice, showing careful planning from experience. Experts take a holistic view of a situation. They reflect and review past work. From the previous skill level, they are constantly looking for better ways to do things.

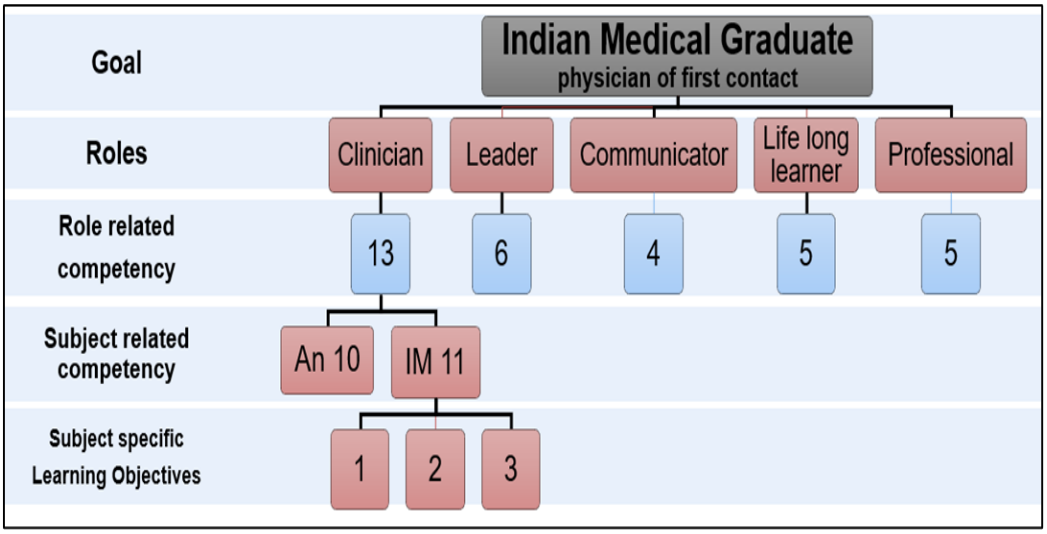

Figure 7: Indian Medical Graduate framework

IMG framework of competence for INDIA

The undergraduate medical education program is designed to create an "Indian Medical Graduate" (IMG) possessing requisite knowledge, skills, attitudes, values, and responsiveness, so that she or he may function appropriately and effectively as a physician of first contact of the community while being globally relevant" [25]. IMG framework expects

Indian medical graduates [IMG] to play five roles clinician, leader, communicator, lifelong learner, and professional. Subject related competencies match with role-related competencies. Subject-related competencies are achieved by framing Specific learning objectives and Miller's pyramid for teaching learning and assessments [25].

Overall

Bloom's taxonomy model focuses on the final objectives with the assumption that competence can be measured discretely under domains and will be equal to competence. Miller's pyramid and RIME model are based on the need for multiple domains applied by the learner simultaneously in real and complex contexts. In CBME, a professional task /activity - should be a unit of assessment rather than focusing on domain-specific objectives.

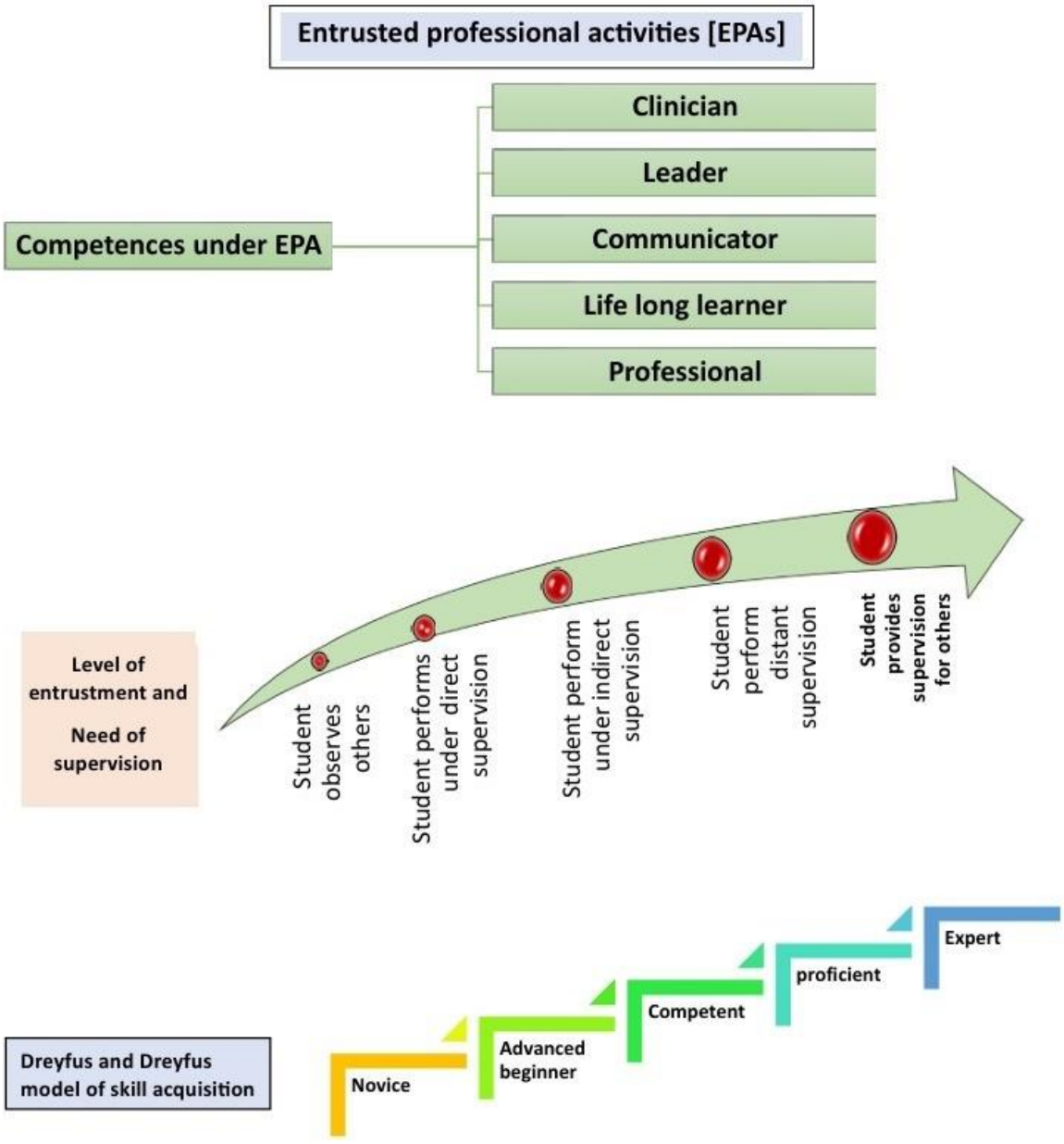

Figure 8: Correlation of IMG framework, Dreyfus & Dreyfus model and EPA

Many aspects of professional competence need the identification of progress and developmental stages in the progress as milestones. Dreyfus and Dreyfus 1980 developed a model of five stages (novice, advanced beginner, competent, proficient, and expert) Dreyfus & Dreyfus applied as a developmental framework for medical training [35, 36]. In this model after the achievement of permissible minimum competency, a certain duration of sustained practice is necessary, to achieve the same competency in different complexities of contexts to move to a proficient level, and usually modification and economization of steps, intuitive alignment of all domains and situational responses becomes inherent to expert level [36, 37].

With continuous tapered monitoring, corrective feedback and work place assessments of trainees' performance -at the proficient and expert levels of professional activities summative entrustment decisions are made [38].

The certification of EPA is beyond competency certification in CBME as it declares that trainees can handle unknown future situations and can be trusted for unsupervised practice in different and complex contexts. Also, important difference between competency and EPA is that competency is an attribute of a person but EPA are description of professional tasks/activities hence contextual and more relevant to professional training [39, 40]

If we observe these frameworks, the trend has shifted as assessments of segregated domains - an analytic approach using SLOs as a basis, units of activities requiring different domains to be applied same time- a synthetic approach using competencies as units of assessment frameworks which help us to make entrustment decisions - developmental in nature, using EPA as units of assessment [41].

2. Learning Theories and Assessment Frameworks

The purpose of assessment in a competency-based curriculum is to help the teachers decide if the students have acquired the desired competencies and to help the students acquire and improve competencies. Assessment greatly drives learning. Assessments used traditionally impacted the learning by behaviourists' mechanism of stimulus-response or by operant conditioning through the reinforcement and punishment mechanisms, with minimal feedback and formative aspects hardly contributing to the decision-making process of summative assessments [42,43]

Learning is more complex than simple behaviourist mechanisms. Complex cognitive processes such as attention, understanding, analysis, and meaning-making, relating to our own experiences and negotiating meaning with others and surroundings are different aspects of learning [cognitivism constructivism] [44,45].

Owing to an exhaustive amount of information to be understood, processed, and applied in the medical field, cognitive learning theory is the inevitable basis of teaching-learning. Metacognitive goals, tasks, and experiences are used in problem-solving and monitoring the efficacy of strategies [46].

Referring to assessment frameworks- competence of clinician, we can say lower levels of frameworks /domains can be taught and assessed by low context and large group methods. But as we progress to higher levels of frameworks involving critical thinking and creativity-

the teaching-learning methods as well as the assessment methods must be highly contextual, small group /even personalized involving elements of feedback and formative aspects. For other competencies as the leader, professional, and communicator the learner needs to understand and internalize the norms with the guidance of teachers who make the professional norms from latent to explicit and back to latent once internalized [47]. In this way, the learner completes the journey from unconscious incompetence -conscious incompetence - conscious competence -unconscious competence as the "Four Stages for Learning Any New Skill" theory developed by Gordon Training International [48].

Professionalism can be interpreted differently by learners in different socio-cultural settings, mostly learned by modelling the behaviours and attitudes of a senior or teacher. The social learning theory advocates the interplay of cognitive frameworks and behavioural interpretations of others whom learners wish to follow. [49, 50] It is like the zone of proximal development provided by more knowledgeable others [teacher, mentor, peer] which helps the learner to the best of his ability under guidance initially and independently in the subsequent phase of learning [51]. The learner thus slowly engages from just participatory to more central activities in the patient care system as argued in situated learning theory reflected in the RIME framework of assessment [52].

Cognitivism, constructivism, social learning theory, zone of proximal development, and situated learning theory support the frameworks [Bloom's, Miller, Dreyfus, RIME, Competence, and EPA] used for assessments. To cross the zone of proximal development - instructional strategies, and scaffolding should be provided by the facilitator mainly in the form of feedback. This helps the learner to develop skills of self-assessment, by identifying the gap between expected standard performance and his present performance leading to the use of assessment for learning [53].

Students can assess others or be assessed by peers to gain complex and authentic experiences of evaluating [54]. 'Sustainable assessment' was coined to suggest the next level of the purpose of assessment on students' ability to identify and satisfy future learning needs, learners create the framework for developing assessment skills for own future learning which is quite like entrustment decisions made by assessors over time [55, 56].

IV. CURRENT LITERATURE ON THE TOPIC- PROS AND CONS OR MERITS AND DEMERITS

1. Assessment as Measurement

Measurement quantifies the scores/results of tests using a set of procedures and principles. Some examples are raw scores, percentile ranks, derived scores, standard scores, etc. [57, 58]

Van der Vleuten in 1996 [59] introduced the concept of the Utility Index for evaluating the quality of an assessment method or tool- as Utility = Rw X Vw X Aw X eiw X Cw

Where R = reliability, V = validity, A = acceptability, EI = educational impact, and C = cost.
As per the utility index, Assessment tools earlier used were based on Test psychology, and the measurement needed valid, reliable, and objective methods of assessments to reduce the subjectivity, which was perceived as a limitation. More structured assessments were devised

to improve the objectivity and reliability of assessments. To differentiate the performance of competent and non-competent performers, [facility and discrimination] indices were used to validate the construct of assessment. As in test psychology individual attributes were assumed to be generic and independent, so tested separately across different domains. Later this notion was questioned, Traits could not be measured independently of each other with different forms of assessments. Clinical reasoning and problem-solving were dependent on background clinical knowledge [60-62] so performance does generalize well across assessment formats, and not generalize well across content [62, 63]

Blueprinting was used for content selection based on the perceived must-know areas and important health conditions derived from national health policies. In assessment, the overall performance was considered for pass where low performance in one aspect or item can be compensated by better performance on another item. So each item was meaningful to the extent to which it contributes numerically to the total score and not indispensable to achieve competency on each must-know/must-do item [as in written assessments and OSCE stations with conjunct overall scoring] [64,65].

The standard setting was advocated to decide the expected level of performance mainly of borderline students to differentiate them into the pass and fail [66].

Test-centred methods are the Angoff method (and its modifications), the Ebel method, and the Nedelsky consider the probability of borderline students answering an item correctly, so the pass cut-off varies with the change in the expert group [67,68]. In student-centred Methods [borderline, borderline contrast method], the pass mark is based on students' actual performance and varies with the cohort of test takers [69].

In the process of standardizing the assessment as a measurement, the human judgment which was perceived as a limitation could not be eliminated as many aspects of standardization are based on human judgment as perception of important areas to be mastered, perceived health problems in policy decision of nation or even the acceptable level of performance for the stage of learner. As understanding grew about the factors leading to unreliability [poor sampling and lack of clarity on what was tested] [70 -73] and there is no one perfect way to assess competency led to a change in perception that human judgment is not a limitation but complementary to the objective methods used in deciding /grading the overall performance of the learner.

Trends in the purpose of Assessment moved from the Summative process [to certify the learner at the end of course completion, to differentiate competent from incompetent, or as a need to select of few students from large numbers as a placement testing] to formative process. Competencies as used in many frameworks [communicator, professionalism, leader, lifelong learner] cannot be evaluated at one point as summative but have a progressive nature. Similarly, Assessment as a process needs to value the learning and monitor the progress of learning in achieving competence, in professional training. So assessment must help in monitoring learning and giving corrective feedback for learners to improve.

The earlier concept of measurement included testing when decision-making is done by using "a specific sample of behaviour" , mostly quantitative methods [74], which can be applied to some competence frameworks such as medical knowledge. An extended view of the relationship among evaluation, measurement, and testing by Bachman 1990 which includes

alternate testing methods can be used for communicator, professional, leader, and lifelong learner competencies of IMG [75].

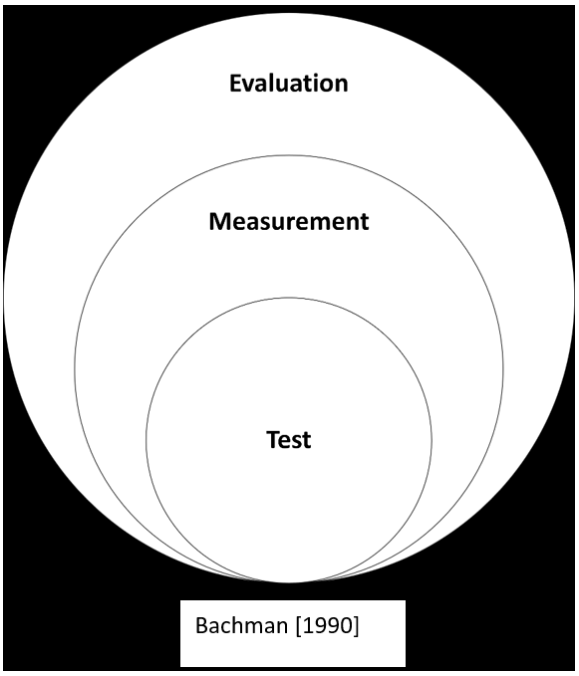

Figure 9: relationship among evaluation, measurement, and testing

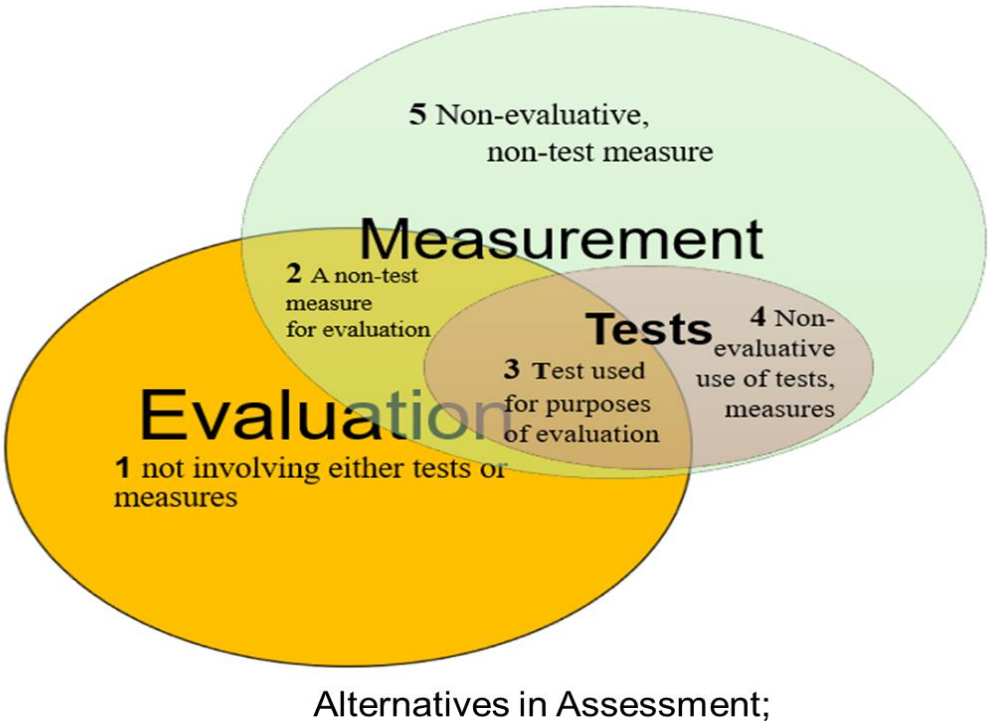

Figure 10: evaluation, measurement, and testing intersections providing alternatives in the assessment of students

Competencies as a communicator, professional, leader, and lifelong learner cannot be evaluated at using quantitative methods only, an approach suggested for language testing can be extended to assessing these competencies. Evaluation /assessment of these can include alternative methods of assessment such as -

1. Evaluation not involving either tests or measures- the use of qualitative descriptions of student performance.
2. A non-test measure for evaluation- teacher ranking used for assigning grades, paper presentation, seminar, workshop
3. A test used for purposes of evaluation- achievement test -OSCE, simulations
4. non-evaluative use of tests and measures for research purposes - ICMR
5. Non-evaluative non-test -helping in the review of literature, paper presentation by learners

Mastery testing is 100% of the items are measured correctly against predetermined criteria [criteria referenced tests] to determine whether students have attained a mastery level of achievements. Giving corrective feedback on individual items is possible only if acceptable performance [criterion-reflected tests] for individual items and acceptable combination of items for total scoring is also standardized [as in OSCE stations].

Measurement in assessment started as individual examiner's judgment with little clarity on what is assessed [Long Answer Questions, Long case], moved to objective assessments with domain specifications and checklists [OSCE, Short Answer Questions , MCQ, Structured Essay Questions] minimizing the role of human judgment and now to more wholesome approach with combination of competencies into an entrust able professional activities at workplace settings, using descriptive rubrics and global ratings done by multiple assessors based on direct observations of performances for entrustment decisions.

2. Assessment as a Judgement

Major changes in the perceptions of assessment over time included- perception of assessment from psychology tests assessing individual traits to competency to be learned and mastered [76].

Standardization and objectivity were not the main reasons for lesser reliability, but the improper, insufficient sampling was. So, for good reliability of assessment, good sampling is required, demanding to shift to contextual settings of learning and assessments. This led to the possibility of assessing multiple aspects of competency -such as professionalism, ethics, and decision-making [77]. Acknowledgment of human judgment in the assessment process in the form of inclusion of assessment for learning, crucial steps of performance contributing to satisfactory performance, and overall decision-making about competence [78].

The paradigm shifted to assessment considered more important as a judgement than as a measurement. Inclusion of Work place-based assessment tools [CWS – Clinical work sampling; COT – Consultation observation tool; CEPS – Clinical examination and procedural skill; CEC – Clinical encounter card; CSR – Clinical supervisor report; mini-CEX- mini-clinical evaluation exercise] was more authentic than standard assessment setting tools as

OSCE. Conducting assessments in the workplace does not offer inherent validity to the assessments but the examiner's role as an evaluator is more important [79-81].

The professional aspects of health care providers such as professionalism, ethics, communication, and empathy where content is not defined, do not have prescribed formats of satisfactory skills and performances. The involvement of patients, standardized patients, and stakeholders to develop criteria for skills and performances, including cultural sensitivity, equality, and diversity is necessary to improve the validity and authenticity of workplace assessment [82].

The examiners should consider the complexity of the workplace as interaction with patients, relatives, other health professionals, technical settings, and multidisciplinary facets of the health care system and real-world practices while making decisions on assessed competencies and standard setting. This kind of practice helps students to develop learning trajectories and mastery, capacities, and lifelong learning [53, 83-86].

As an examiner, observation, and interpretation of such complex situations of competencies in a real setting demand expertise to differentiate, and discriminate from a range of performances into competent/satisfactory, and incompetent. Cognitive and affective processes in ‘diagnosing competence’ of students are like diagnosing disease and need training, practice, and feedback for examiners [87-90].

Assessment literacy of examiners reduces inter-assessor variability by correcting the differences in the frame of references, application of criteria, and forming shared mental models of subjectivity and leniency bias. Faculty development programs also help faculty to address unconscious biases and to be aware of cultural differences [91-94].

3. Assessment as a System

With the realization of the complexity of education and the factors involved in assessment and decision-making, the focus shifted to formative aspects. Similarly, changes occurred in the system of assessment - as a system of observing the process of problem-solving with a whole system approach from a method-focused system for judgment decisions [95]. Rather than adopting a pass/fail type of binary, reductionist systems of decision-making of competence, multiple data sources from different assessment methods and assessors gained popularity [96-98]. This way strengths and limitations of one tool and/or the assessor are balanced by another. Competence generalizes better across the formats than content. Quarter model of assessment is proposed in this direction, the contribution of each assessment to final marks, assessment tool, and assessor’s marks to each student is not more than 25% [99].

Other approaches are holistic integrated assessments with an attempt to recreate the complexity of competency and constructive and interlinked tasks [100]. Continuous /programmatic assessment aims to generate enough observational data regarding students' performances throughout the course to make judgment decisions that can be defended easily [101].

The choice-based credit system, academic credit banks, and transferability across different countries are steps toward making the system more flexible and global.

After considering the trends in assessment as measurement, judgment, and system, we can conclude that

The reforms in the assessments of medical undergraduates include the shift to competency-based education, competence frameworks of references for professionals, outcome-based assessments on competency achievements through EPA, and rubrics to monitor the progress of learners. Use of continuous longitudinal formative assessments and feedback for learners, use of multiple tools of WPBA, the inclusion of non-evaluative, non-measure tests for holistic and integrated evaluation of competence, selection, and training of faculty to improve assessment literacy, question bank, standard setting and defensibly of documentation of student performances, use of technological interventions and inclusion of emerging competencies [as -AI, COVID], flexible and transparent students centered system.

❖ CBME, EPAs, Milestones & Rubrics

In the last 30-40 years competency-based framework has gained popularity. Many well-known competency frameworks are The Accreditation Council for Graduate Medical Education (ACGME) in the United States, The General Medical Council (GMC) UK The Canmeds framework in Canada in 1996 [102] The Assessment of Clinical Performance (ACP) in Australian medical training, Canmeds- NL Framework for Netherlands [103].

The use of Entrust able Professional Activities (EPA) in competency frameworks for medical undergraduates is a relatively new development. Few countries as Canada, Netherlands, Singapore, United States, have incorporated EPA, bench marking- milestones, and rubrics into their medical education frameworks for assessments [102-105].

Statement of clear learning outcomes, EPAs, and assessments designed [milestones and rubrics] to measure the extent to which students have achieved these outcomes is useful in knowing the practice readiness of the students at the end of training. As opposed to assessment based on SLOs which is the expected result at the end of training. EPAs, milestones development, and the use of descriptive rubrics are ways to achieve competencies. The assessor can decide the tools of assessment depending upon the level of supervision needed, and the expected performance level on skill achievement [106-108].

The Accreditation Council for Graduate Medical Education (ACGME) is a flag-bearer in this area and has described the competency framework for residency, the Milestones Projects describe the learner's progress toward competence within each domain [109]. 40 national and multi-institutional studies about the milestones have been completed, and a bibliography of milestone research is available on the ACGME website [110-111]. Many institutions and countries USA, Canada, New Zealand, Australia, and Scotland are developing subject-specific milestones and EPA for undergraduate medical training and assessment, and a small proportion of studies are conducted on the assessment or implementation of EPAs [112-123]. Based on a pilot study on 10 schools the AAMC proposed 13 Core EPAs expected from a new resident, to promote ease of transit to a medical residency [124]. Other Asian countries promoting CBME are India, China, Malaysia, Sri Lanka, and Bangladesh.

The use of descriptive rubrics for giving learner-specific feedback and knowing what constitutes good performance, critical components of good performance, and competence

level is well established across different disciplines. Rubrics are used to assess clinical skills, grade assignments, and analyze presentation portfolios. Rubrics provide consistency in evaluation, reduce subjectivity, and high inter-rater reliability [125-135].

❖ Continuous, Longitudinal, Formative Assessments and Feedback for Learners

Continuous assessment enhances student motivation and better performance in internal assessment and final summative examination [136- 138]. Programmatic assessment is used in medical education and aims to continually collect, analyze, and make learners aware of his/her competence progress, periodically reviewed by an assessment committee and for high-stakes decisions at the end [139- 142].

Formative assessments also known as assessments for learning - aim to guide the individual learner to improve and are not usually graded/ranked to know the position in class, is strongly recommended [WFME]. Formative assessments and feedback go hand in hand, and should be monitored, and feedback forms a part of systems in many countries [143- 145]. Formative assessments serve the purpose of competency achievement in CBME and the mechanism of quality assurance in medical education.

Some Asian countries [India, Bangladesh, Pakistan] use assessments that contribute 10-20% to the summative assessment scores [usually misunderstood as formative assessment] are internal assessments and can be formative if there is feedback to students on their performances based on predetermined criteria.

The use of a variety of activities, various tools, and techniques, a non-threatening and supportive environment, diagnostic and remedial, and the formal and informal approaches of assessment are characteristics of formative assessment. Student projects, Concept Mapping, Constructed Response Questions (CRQ), Critical reading papers, rating scales, extended matching items, tutor reports, portfolios, short case, and long case assessments, log book, trainer's reports, audits, simulated patient surgeries, video assessment, simulators, self-assessment, peer assessment, and standardized patients. Virtual Patient Simulations are some innovative formative assessment tools in medical undergraduate assessment [146-147]

Feedback has the most impact on student learning and accomplishment, by providing "feed-forward" on the next performances, creating meaningful, constructive learning experiences by developing self-assessment and reflection [148,149].

❖ Use of OSCE

OSCE developed by Dr. Harden in 1970, consists of scenario-based 10-20 stations, used to assess clinical skills, communication, empathy, and sensitivity with a standard checklist within the fixed time frame for all students. OSCE are valid [avoids chance assessment] objective, reliable, and consistent [owing to the use of a checklist and number of stations covering a wide range of content area] [150-152]. As opposed to traditional unstructured clinical assessments as long cases. OSCEs serve to measure outcomes and allow very specific feedback. Blueprinting and Criterion-Referenced Standard setting enhance validity and defensibility in decision-making of competence. OSCE is the most utilized tool in most

countries for formative as well as summative assessments in undergraduate and license examinations [153,154].

OSCE compartmentalizes a candidate's skills, and knowledge and assesses different components of competency separately and it is performance in a controlled setting, does not necessarily assure competence in the real world, and has poor generalizability [155, 156]. The need for a greater number of assessors on observation stations, cost, and time in planning and implementation of OSCE are limiting factors

❖ Work Place Based Assessment Tools

These are tools for collecting data on observed behavior at the time of actual performance, patient encounter, and by using multiple observers and occasions. These include observation tools and discussion tools [157]. Based on a review of 180 articles, 67 WPBA tools are classified as Short-practice observations, Long-practice observations, Case-based discussions, Simulation tests, and Product evaluation tools [158].
Commonly used tools of WPBA are as follows

❖ Mini-CEX (Mini-Clinical Evaluation

Developed by the American Board of Internal Medicine (ABIM) in the 1990s. It is a 9-point rating scale of each encounter for about 15-25 minutes, including the time spent observing students and the feedback given. The evaluator records the complexity of the patient's problem; type of visit (new or revisit); setting, and focus of the visit (data gathering, diagnosis, therapy, or counseling). Mini CEX is a good real setting, a contextual tool to assess different levels of performance, reliable tool with a minimum of 4-6 encounters [159, 160].

Formative use to provide feedback and improve trainee performance is advocated. While opportunities to make it reliable for summative use may not be feasible. However, some countries have incorporated Mini-CEX into their summative undergraduate assessment programs United States, Canada, Australia, United Kingdom [161-166]. Interviewing, examination, communication, professionalism, organization, overall competence, and various task-specific skills are commonly assessed. Mini-Clinical Evaluation Exercise (Mini-CEX) for feedback and to make entrustment decisions in postgraduate assessment [167].

❖ Direct Observation of Procedural Skills -DOPS

Is like a mini CEX- a scale for assessing and providing feedback on procedures done by learners. Need multiple encounters, with different patients, procedures to collect evidence about a student's competency in technical skills. Portfolio entries of DOPS are used for formative assessments. Multiple sessions of DOPS result in improved skills and confidence of students. In modified DOPS- correlations are seen between the first and second scores of doing the same procedure and the scores of the two individual examiners when observing the same procedure [168-169].

Direct feedback, motivation to students, and acceptable validity and reliability are advantages of DOPS. Stressful evaluation, time limitation, and bias between assessors, variability of

feedback are the main limitations [169,170]. DOPS and modified DOPS are successfully used as a formative and summative assessment tool during their clinical postings in undergraduate assessments.

❖ Clinical Work Sampling

Depending on the context of patients, in different situations performance rating forms (Admission Rating Form, Ward Rating Form, Multi-disciplinary Team Rating Form, and Patient's Rating Form) are used. Admission Rating Forms collect data on communication skills, physical examination skills, diagnostic accuracy, management skills, and global performance.

Ward Rating Form: included as part of the process of patient billing. Seven content domains assessed include therapeutic strategies, communication skills, consultation skills, management skills, interpersonal behaviors, continued learning skills, and health advocacy skills as well as a global rating of overall performance.

Multi-disciplinary Team Rating Form uses therapeutic strategies, communication skills, consultation skills with nurses and other health care providers, management of resources, discharge planning, and interpersonal relations as well as a global rating of overall performance.

Patient's Rating Form: To capture input from patients, a seven-item evaluation form outlined four content domains; communication skills, collaboration skills, health advocacy skills, and professionalism as well as a global rating of overall performance.

With sufficient encounters for reliability, coefficients were high for the Ward Form and the Admission Form [171]. In a review, CWS is strongly advocated owing to the high reliability, validity, feasibility, and better educational impact [172].

❖ Case-based Discussion [CbD]

In CbD after a clinical encounter or procedure of 10-15 minutes, clinical competence, clinical reasoning, and clinical decision-making are assessed by interviewing the learner. The discussion and feedback should take less than 30 minutes. Before choosing the CbD, trainees must inform the clinical details to the assessor and find the case to three capability areas to be assessed. CbD can be used for formative assessments, supplemented with feedback, both quantitative and qualitative. However, training in the process of conducting discussions and delivering effective feedback is necessary [173-176].

❖ 360 Evaluations

Frequency of observable behavior such as communication skills, interpersonal relationship work habits, team work, and interpersonal sensitivity is marked using a rating scale (e.g.,1=frequently, 5=never). The observation is done by the supervising physicians, peers, other members of the clinical team, and patients. 360 Degree Evaluation is proposed as a learning framework itself. Health team, peer, and patient evaluation promote teamwork and collaborative leadership skills, supporting own learning process, patient centered care

philosophy, respectively [177] Assessment of the actual performance of students in the authentic setting is done but data collection and analysis from many raters is difficult.

❖ Portfolio

Portfolios provide a holistic and longitudinal self-assessment and reflection of various experiences during learning and career [178-180]. Portfolios differ from logbooks, by having reflection, and evidence of learning- of how learning happened [181- 186] through those activities. While the logbook is mainly documentation of patient care and learning experiences. Portfolio use has shown improved communication skills, professionalism, experiential learning, and better achievements in post-graduate studies [187,188]. The use of portfolio assessment led to the enhancement of knowledge- the ability to integrate theory with practice and understanding, self-awareness, reflection, and the ability to learn independently and improve feedback to students [189]. Need of training of faculty and learners is required given the purpose of the portfolio and, the authenticity of the material presented in the portfolio [190]. Reyes D and colleagues from Chile introduced portfolio-based Learning for clinical cases for 4th-year medical students [191].

Advantages and Disadvantages of WPBA

WPBA ultimately uncovers real opportunities to improve education and patient care. These assessment methods require observation, provide opportunities for feedback.

Research data on assessment and feedback show that it is an effective way to change students' and students' behavior.

Feasibility-issues in implementation clinicians are already overwhelmed and they need to give time to training and evaluation for individual student on multiple occasions. Expertise is important in providing feedback on performance appraisal, which is consistent with trainees' requirement and on crucial aspect of performance. courses and training in appraisal methods and techniques are required.

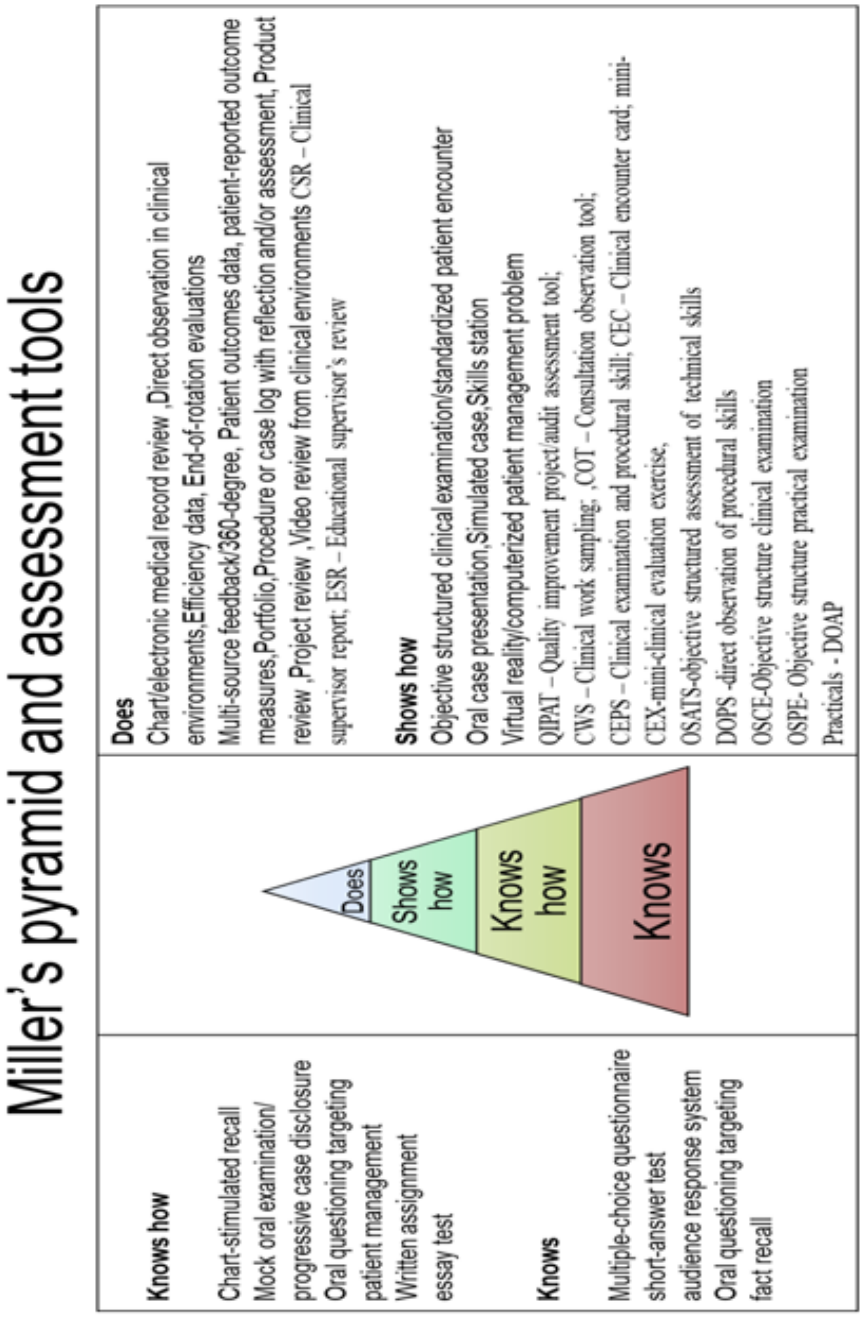

Figure 11: Mapping of tools of assessments and Miller's pyramid

❖ The Inclusion of Non-Evaluative, Non-Measure Tests for Holistic and Integrated Evaluation of Competence

Tests are conducted to sample the performance of test-takers in a specific domain. For holistic and integrated evaluation of competence, assessment should encompass all the instances of teacher students' interactions, observations may be in formal /non-formal settings [192]. The characteristics of non-evaluative, non-measure tests, also named alternative tests are mainly described in language assessments in schools [193-196]. Alternative tests/ non-test instruments are testing instruments in addition to learning achievement tests. These

assessment tools include observation or observation sheets (such as diaries, portfolios, life skills), attitude test instruments, interests, interview techniques, and questionnaire. For the construction of non-test tools, tests of attitude scale, learning interest tests, achievement motivation tests, creativity tests, and learning stress tests can be used [197,198]. The use of these tests justifies the varying abilities of students and domains of multiple intelligence [as verbal-linguistic, mathematical-logical, musical, visual-spatial, kinaesthetic, interpersonal, intrapersonal, naturalist, and existential] tapping into multiple intelligence [199].

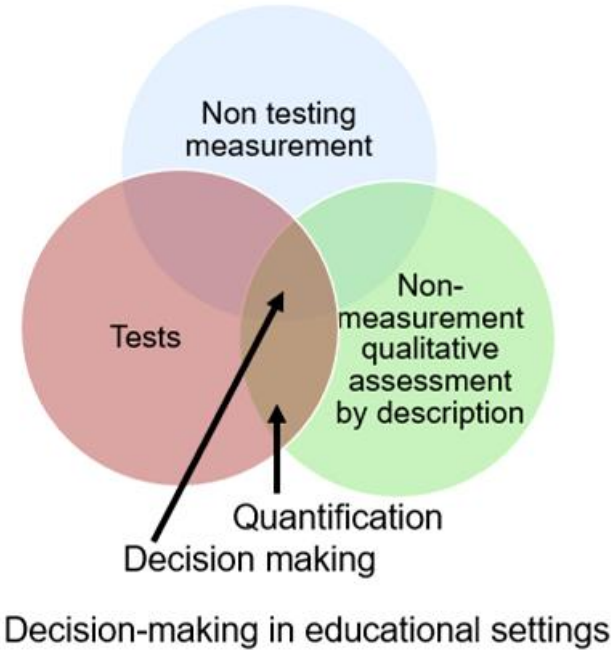

Figure 12: Summative decision-making aspects

These assessments can be alternative to the end-of-semester exam if aligned to the learning outcomes/competencies assessed. Observation, social projects, Oral Assessment, Portfolio, Participation in teaching-learning, patient surveys, creative writing, models, maps, charts, and graphs, concept maps, debate, journal reading, presentations, demonstrations in small groups in practical /clinical settings, role plays, conferences /CME presentations, organization, preparation of resources, critical analysis of resources, reflective writing, quizzes, case study, annotated bibliography are different tools which can be in line with assessment of communication, lifelong learner and leader roles of medical undergraduate. These non-evaluative -nontest measures which include daily activities must be considered in decision making- there is a great possibility of identifying potential administrators, and leaders in health care.

❖ Selection, and Training of Faculty to Improve Assessment Literacy

Infrequent curriculum review, lack of standardized assessments, inadequate training in medical education and a lack of faculty development programs are reported [200- 203]. Expertise in the subject & years of teaching experience are common criteria set out by professional and accrediting bodies for selecting the assessors. Selection of the Examiner is expected to be based on expertise and experience in the design and delivery of assessment. Examiners

should be aware of the expected standard of students and curriculum changes [204]. The examiners are expected to review assessment strategies, processes, and systems. Knowledge of assessment tools, fair and impartial, objective assessment, analysis of performance and giving constructive feedback, standard setting and awareness of policies, cultural, social, and religious backgrounds are different aspects of assessor's roles.

As an examiner, observation, and interpretation of such complex situations of competencies in a real setting demand expertise to differentiate, and discriminate from a range of performances into competent/satisfactory, and incompetent. [205-206].

Assessment literacy of examiners reduces inter-assessor variability by correcting the differences in the frame of references, application of criteria, and forming shared mental models of subjectivity and leniency bias. Faculty development programs also help faculty to address unconscious biases and to be aware of cultural differences [91-93].

❖ Question Bank

Increased use of question banks prepared by students /universities, available online is reported with increased performance of students [207]. A question bank should include questions from different difficulty levels, with proven reliability that cover all the learning objectives throughout the program. Questions included in the bank should be mapped to Bloom's taxonomy and learning outcomes- to create a good achievement test, with 60% moderate questions, 20% easy questions, 20% difficult questions, and a good discrimination range. It should include from must to know[core] and desirable-to-know areas. Based on the blueprint, and mapped course outcome, an automated question paper setting is preferred than manual method. Some colleges have prepared question banks for use of faculty and students [208-210].

❖ Standard Setting and Defensibility

With the appropriate panellists for standard-setting processes, institutions are accountable for the use of standard-setting methods in relation to the assessment methods used. Standard setting Angoff and borderline group scoring are the most appropriate proven methods of standard setting in clinical assessments as OSCE [211-212].

❖ Use of Technological Interventions and Inclusion of Emerging Competencies

Because of technological advances, the transition from traditional pen-and-paper testing to electronic exams and the use of digital assessment formats commonly tablet-based is on the rise [213- 219]. Multiple choice questions (Type-A) and long questions Pick-N, Kprime, and Freetext, modified essay questions, and portfolios are different tools used in written electronic exams. OSCE, simulation and simulators, and virtual patients are used for performance-based assessment. Media like pictures, video, and audio and combinations of text, picture, and video are utilized in questions [220-221].

V. IMPLEMENTATION IN THE INDIAN

1. Situation, If Already Done, Where and What are the Results If Not, What are the Constraints; How Can We Implement

As per The Medical Council of India (MCI) guidelines, all the medical colleges have implemented CBME to produce Indian Medical Graduate (IMG) who is physician of first contact. Competence frameworks of references for IMG include clinician, leader, communicator, professional, and lifelong learner. Outcomes in CBME are measured through EPA and rubrics/milestones to monitor the progress of learners. EPAs are not developed at the policy level yet. Some institutes are using subject-specific milestones in undergraduate medical assessment in India [222-225].

However, the MCI /NMC has provided three volumes of the curriculum with recommended topics, core and non-core areas, areas of integration, teaching-learning, and assessment methods & list of 40 certifiable skills is provided. The use of continuous longitudinal formative assessments based on blueprint and feedback for learners is recommended, use of multiple tools of WPBA, [226] and the inclusion of non-evaluative, non-measure tests for holistic and integrated evaluation of competence are suggested. Tools suggested include Informal assessments during teaching-learning activities, the use of techniques like clickers, one-minute papers, and muddiest points, The SNAPPS technique is advocated for the teachers on a day-to-day basis [227].

For training of faculty to improve assessment literacy- The Regional Centres conduct Basic Course Workshop (BCW) in Medical Education Technologies, Attitude, Ethics and Communication Module (AETCOM), and Curriculum Implementation Support Program (CISP). In addition to these three trainings, Nodal Center runs the Advanced Medical Education Course (ACME). As of December 2018, MCI has funded 904 pre-revised Basic Course Workshops, 520 revised Basic Course Workshops, and 273 workshops on Attitude, Ethics and Communication module. 44,932 faculty have been trained in these Workshops [228].

5 years of teaching experience after post-graduation is eligible for undergraduate internal /external examiners. Creation of Question bank, requirements of psychometric analysis of assessment tools, standard setting, and defensibility of documentation of student performances -these aspects of assessment are not addressed in the policy by MCI/NMC, and neither it is mentioned that universities /institutes are accountable for these parts of assessment system. Use of technological interventions as computer-based assessments can be used in formative assessments. Simulations and skill labs are made mandatory for all institutes.

2. What are the Constraints, How Can we implement?

Some key features of the new curriculum are horizontal and vertical integration, Early clinical exposure, Student doctor method of clinical training, electives, skill development and training, secondary hospital exposure, attitude, ethics, and communication (AETCOM) module [229-234].

The expectation of CBME is the achievement of competencies by IMG, but it retains the existing discipline-based format, which is a limiting factor. There is not much change in the content of the curriculum, though it is arranged in large volumes of curriculum. MCI has followed The Research, Development, and Diffusion (RD&D) Model of Curriculum Innovation due to the large scale of implementation. The Problem Solving (PS) Model of curriculum, with a problem-based curriculum would be ideal for implementing CBME, which would enhance integration, knowledge application, problem-solving and self-directed learning [235, 236]

EPAs and milestones need to be developed in India as per contextual needs. In the present situation major structural change in the system of institutions is not possible because of the large number [more than 530 presently] and variety [in terms of infrastructure, management-government/private, cohort of students, faculty strength] of institutions in India. Individual disciplines at the national organization level or even at the university level can take up the responsibility of framing EPAs, milestones and modifications can be done over time as per the context of institutes. Periodic revision of content and policies concerning assessments should be allowed- considering feedback from faculty, subject associations, students after every academic year and at the end of the course, and other stakeholders. This would allow the inclusion of emerging competencies [as -AI, and COVID]

The Curriculum Implementation Support Program was conducted by MCI through faculty development programs. However, monitoring by the departments, MEU, curricular committee, IQAC, and academic section at Institution levels must be in place. Identification motivation, and utilization of correct resources are important for long-term monitoring. To handle added responsibility, enough faculty and materialistic resources must be provided by institutes.

Certification of competencies-competencies need to be observed during learning and can be only certified by faculty in respective departments. For competencies that require a ‘Show How’, or ‘Perform’ level of competence, the provision of a learning experience that allows skills practiced repeatedly under supervision is critical. Considering the requirements of the skills module and competency-based assessment module, some challenges that can be anticipated are:

1. The number of skills that need to be taught and assessed is not proportional in the guidelines to the duration of training in the respective subjects. Some subjects are missing the certifiable skills [237]
2. Since 50-60 students are posted in major departments at a time, teaching and assessing one skill every week for a group of 30 students each, in skill labs in groups of 6-8 students would exceed the availability of faculty in many instances. Smaller departments like dermatology psychiatry etc. May have only one faculty available for this purpose most of the time.
3. Formative processes demanding feedback for individual students like DOAP, OSCE, and mini CEX cannot be implemented in the given time frame.
4. This practice of teaching, assessing, and certifying would be required for all the days around the year which would be taxing for the faculty. The skills that need not be certified but need to be assessed also need to be included in teaching.

In such a situation faculty are likely to revert to what was done earlier where certification was required only in a log book. Besides, there is a chance that skill assessment and certification may become opportunistic instead of systematic, due to lack of available resources and clinical material.

Suggestions for Overcoming the Above Issues

Since the CBME batch has just entered third year, we have to be prepared.

1. Faculty and resources required for skill labs need to be recruited and ensured

2. The time allotted for clinical postings and skills learning needs to be increased according to the number of certifiable skills and skills expected to be taught and need not be certified. This however is within the regulatory domain and needs to be addressed by them. Alternatively, similar skills listed under different departments may need to be clustered together for training and assessment.

3. Training of faculty for implementing new T/ L methods and use of assessment tools, preparation of OSCE, OSPE stations, checklists, etc. Should be started through meus of colleges, monitored by regional centres. Clinical faculty should take advantage of feedback and help of the first- and second-year faculty to anticipate and overcome difficulties of implementation since they have already experienced the new curriculum for at least two batches. The regulatory agency should provide guidance and dissemination of T/L and Assessment materials across all institutions to ensure uniformity.

4. The possibility of training nursing and Allied Health Sciences staff for implementing new T/ L methods and use of assessment tools, and preparation of OSCE, OSPE station checklists should be considered. They should also be trained in giving and receiving feedback, receiving and analyzing data obtained from formative assessments and maintain records.

❖ Use of OSCE, OSPE, WPBA

OSCE, and OSPE have not been used in summative examinations even in postgraduate [MD, MS] assessments except in very few instances [DNB] very few institutes are using these tools in formative assessments [238, 239] Recently OSCE has been added in some universities as an assessment tool, but it is still in developing phase. RGUHS has 3,4 OSCE stations in summative exams which is not a good sample size for the reliability of OSCE. Other tools of WPBA are not utilized to their fullest advantage.

❖ Contribution of Formative Assessment to Summative Assessment and Pass /Fail Decisions

Formative assessments and feedback are greatly emphasized in the implementation of CBME. Successful completion of certifiable skills is mandatory to appear for university examinations. 20% of marks contributing to internal assessments are from attendance, part completion tests, professionalism, and participation in early clinical exposure. The remaining

80 % IA contributed by an average of internal theory and practical examinations during the course.

Theory and practical internal assessment average should be at least 50% with a minimum score of 40% in each- to appear for university /summative examination. So IA including formative performances only serves as eligibility criteria and not contribute to summative assessment, which is contrary to the promise of CBME.[240]

Proportion of Internal Evaluation (IE) to External Evaluation (EE) should be specified for UG (30:70) and PG (40:60), and can be raised progressively in a phased manner to 50% depending on the outcome of the experience. Before CBME, Internal assessment contribution to the final examination was 20%. To pass the summative examination in CBME, students have to score 50 % marks in theory and practical separately in the summative examination. Students must score a minimum 50 % average for 2 theory papers, with a minimum of 40% score in each paper [241, 242].

❖ Flexible System of Assessments

CBME does not support the concept of time-based training and promises flexibility in learning time and assessments. Presently, in India, flexibility of learning and assessment time is not possible as the time frames for summative examinations are fixed and a minimum of 3 internal assessments [theory and practical] are to be conducted before the summative examinations. Only one remedial examination is allowed before summative examinations if the student is not scoring the eligibility of an average of 50%. If a student fails in summative, supplementary examinations are conducted within 1 month from the results. A maximum of 4 attempts is allowed for passing any subject, but the student should pass the first year in 4 academic years and pass a complete course in a maximum of 10 years from admission.[240]

So technically the assessment system is very tight and does not allow much flexibility for students. Also, there is no fall-back system / multiple exit points during MBBS. If a student cannot continue /fails to complete the course, he/she is not offered any qualifications.

❖ Choice-Based Credit System

Choice-based credit system can be included in the health profession, would require modification of content to be delivered in a particular sequence and pattern, mostly system-based approach would be better suited for the purpose. Content can also be modified as essential for undergraduate -core, supplementary within subject content, and supplementary area related to other subjects.

CBCS, grading, and competency certifications together will serve the purpose of flexibility, credit bank, and transfer across the universities.

❖ Question Banks

are usually collections of question papers of the previous year provided on university websites or compiled by some students/authors which are available for students. These are not question banks referred inn assessment systems. Some institutes are having question

banks developed but it is not a mandatory aspect of assessment yet. Psychometric analysis of questions used in the university exam papers is cannot reliably commented upon. The standard setting also is not followed in university assessments in India at present. Lack of time, infrastructure, and expertise may be limiting factors.

❖ Use of Technology

Technology is mainly in helping the process of administration and management of assessment as - registration of students, filling up of examination forms, seat numbers, admit cards/hall tickets allocation, documentation of list of paper setter, online distribution of question papers, a bar-code system for answer books, digitization of answer scripts and onscreen evaluation of answer sheets, Marks submission through online software, declaration results, and mark sheets through the online system. It can be extended for use in LMS assessments, assignments, simulations, portfolio generation, evaluation, and data collection of continuous assessments.

VI. CONCLUSION

India has initiated a pivotal change in medical education by implementing the CBME curriculum. Release of the curriculum in three volumes, detaining the content, TL Methods, core areas, possible integration areas, and level of performance expected as per the Millers pyramid. NMC/MCI has also started new welcoming changes as the inclusion of foundation courses, AETCOM, Early Clinical exposure, guidelines on assessments in CBME, Pandemic, and online learning modules for inclusion of newer competencies.

The revision of content and structure is worth appreciating. Similar changes are expected in the assessment domain of the curriculum. Revision of certifiable competencies, logistic arrangements in the training schedule, feasibility of formative training, feedback and assessments of all global competencies [including communicator, professional, lifelong learner, and leader], assessment of competencies which need not be certified, inclusion of more WPBA, standardization of assessment methods and provision of enough resources - faculty, infrastructure, training and continued support for faculty is necessary

Creating the list of subject-related EPAs, milestones -and frequent revisions, implementation of formative assessments to be monitored, student and faculty feedback regarding difficulties in implementation and possible areas of improvements should be considered. A positive step to psychometric analysis - the formation of a standard question bank, and standard-setting methods at the university level is necessary.

A change that is initiated with CBME can be completed with a second thought in these areas by changing the assessment system seriously.

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