Skill or Competency: What Should we be Assessing?

Nilima Shah,[1] Piyush Gupta,[2] Tejinder Singh[3]

[1]Department of Psychiatry, Smt. NHL Municipal Medical College and SVPIMSR, Ahmedabad, Gujarat, India
[2]Department of Pediatrics, University College of Medical Sciences, New Delhi, India
[3]Chair, Centre for Health Professions Education, Adesh University, Bathinda, Punjab, India

ABSTRACT

India introduced competency-based medical education (CBME) in the year 2019. There is often confusion between terms like ability, skill, and competency. The provided curriculum encourages teaching and assessing skills rather than competencies. Though competency includes skill, it is more than a mere skill, and ignoring the other aspects like communication, ethics, and professionalism can compromise the teaching of competencies as well as their intended benefits to the patient and the society. The focus on skills also undermines the assessment of relevant knowledge. This paper clarifies the differences between ability, skill, and competency, and re-emphasizes the role of relevant knowledge and its assessment throughout clinical training. It is also emphasized that competency assessment is not a one-shot process; rather, it must be a longitudinal process where the assessment should bring out the achievement level of the student. Many of the components of competencies are not assessable by purely objective methods and there is a need to use expert subjective judgments, especially for the formative and classroom assessments. A mentor adds to the success of a competency-based curriculum.

Keywords: *Clinical competence, Competency-Based Medical Education, Knowledge, Skill assessment*

INTRODUCTION

India introduced competency-based medical education (CBME) in the year 2019. While the need to keep pace with global trends would have been a reason for the change, a perceived lack of skills amongst Indian medical graduates seems to be the other major reason. Little wonder that a major emphasis in the new CBME curriculum has been on skills. The faculty were trained in the art and science of teaching and assessing clinical skills, skill labs were mandated and a list of skills to be learned or demonstrated was provided.

The concept of medical competence has been rather fuzzy [1] and perspective plays a major role in its conceptualization. The emphasis on teaching and assessing skills is expected as skills form an important component of competency, which is amply illustrated by the iconic definition of competence provided by Epstein and Hundert [2]. They defined clinical competence as *"the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and*

Correspondence to: Dr Tejinder Singh, Chair, Center for Health Professions Education, Adesh University, Bathinda, Punjab, India.
drtejinder22@gmail.com
Received: Jan 07, 2024; Initial review: Feb 05, 2024;
Accepted: Feb 13, 2024

reflection in daily practice for the benefit of the individual and community being served". This definition includes dimensions of competence in various other domains required for patient care, which also need as much attention. Competence is a multi-layered construct and many ways to describe these layers are possible. Ten Cate et al have suggested viewing competence in three layers *viz.* a core layer of canonical competence, a layer of contextual competence, and a layer of personalized competence [1]. While the canonical layer can be standardized in terms of outcomes and assessment methods, the other two need personalization. In the conceptualization and implementation phase of CBME, a semantic problem with the terms like ability, skill, competency, and competence seems to have compounded the issue. These terms are often used interchangeably. It is not surprising because the dictionary meaning of all boils down to 'doing something'. However, educationally, and especially in the context of CBME, there are differences in the meaning and intent which can have an important bearing on the way we deliver and assess the curriculum. The competencies are deconstructed into learning objectives for teaching and assessment; sometimes they are labelled as 'knowledge competency' or 'skill competency' (although this goes against the very meaning and concept of competency), and this further complicates

the problem.

Ability, Skill, and Competency

Let's first look at competence and competency. Competence is an overall umbrella term, which includes several competencies required for the individual to be called competent. The National Institute of Health [3] defines competency as '*an observable combination of knowledge, skills, ability, and behavior that contribute to individual and organizational performance'*. Inherent in this is the fact that competency implies using its various components in the actual workplace. Read together with the definition of clinical competence, it means that the task is being *performed in the workplace* for the benefit of the patient. Skill on the other hand denotes a specific learned proficiency that enables one to accomplish a specific task [4]. Ability refers to an innate potential to perform (e.g., possessing requisite knowledge, technique, dexterity, coordination, etc.); in a sense, the ability doesn't mean actual performance but only *the potential* to perform by possession of attributes needed for performing a task. The important factors that distinguish a skill from a competency therefore stand out as context and benefit to the individual being served. This can be better understood with the examples given in **Table I**.

Some other interesting facts are also visible in perusing the meaning of skill and competency. One can note that skill is a component of competency but is not the only component. Integrating other components like communication, knowledge, clinical reasoning, emotions, values, and reflections is required for a skill to become a competency – with the rider that these are used *habitually* and *judiciously*. The integration in CBME, therefore, is not limited to subject matter but must extend to knowledge, skills, attitudes, clinical reasoning, emotions, values, and reflections relevant to a particular competency. Another important aspect is the fact that the purpose of CBME does not end with the student acquiring competencies but with her being able to use these competencies in practice – habitually and judiciously – to improve the health status of society [5].

Implications for Assessment

What influence will this distinction between skill and competency have on how we assess students under CBME? There are two important implications- first, assessment must rise above non-contextual knowledge and skill assessment, and second, since the competency behaviors must be demonstrated habitually and consistently, a single assessment, however perfect, will

Table I Ability, Skill, and Competency

Term	What it means	Example
Ability	Having the required attributes for performing the task.	A second-year medical student, who knows about the anatomy and physiology of the upper gastrointestinal tract, indications, and contraindications for passing a nasogastric tube and the procedure required thereof, has good hand-eye coordination and dexterity, can be considered to have the *ability* to insert a nasogastric tube.
Skill	A learned proficiency- through education, practice, or experience- and an actual performance on a specific task.	When this student learns more about the procedure, observes the demonstration given by the tutors, practices it in the skills lab, and then correctly performs the actual procedure on a manikin, she has acquired the *skill* of passing a nasogastric tube.
Competency	The task as described above, when performed in a clinical setting for the benefit of the patient, integrating the knowledge, skills, communications, and professionalism, which contributes to individual and organizational effectiveness.	When the same student during her final year or internship, passes a nasogastric tube in the emergency department on a 2-year-old child brought with suspected ingestion of some tablets and aspirates the gastric contents after taking appropriate history, performing a relevant physical examination, comforting the child, communicating with the parents, obtaining proper consent, documenting the procedure in the case file, seeking expert help to decide on further course of action, and advising the parents of preventive action, has demonstrated the *competency*.
Competence	A collection of various related competencies, which are used habitually and judiciously for the benefit of the patient and community being served.	Accumulation of many other related competencies would entitle her to be called competent to provide initial care for emergencies in children in a hospital setting.

*Please note in the above example that just like the student learned, prepared for, and practiced the skill of nasogastric tube insertion, she also needs to prepare for and practice (and be assessed for) the other components of the competency mentioned above.

never be enough to certify the competency (and student as competent). The need for CBME arose because the graduates were not able to integrate knowledge, skills, attitudes, communication, etc., taught and assessed separately into a meaningful whole and therefore could not provide quality care. It is alright to deconstruct competencies into narrow and narrower learning objectives for teaching purposes, but the learners may not be automatically able to construct these back into a competency [6]. The tendency to assess only at the level of learning objectives strikes at the very reason for the advent of CBME.

Attributes of Good Assessment

Any discussion on assessment must include the important attributes of assessment viz. validity, reliability, feasibility, acceptability, and educational impact [7]. Of these five attributes, the first two are 'intrinsic' to the results of assessment and the last three depend on the 'context' or educational environment and together provide a very useful notional concept of the *utility of assessment*. This concept tells us that a meaningful trade-off can be made between various attributes depending on the purpose of assessment (e.g., high reliability for selection tests versus high educational impact for formative or classroom tests) and that if any one attribute has a value of zero (e.g., an assessment prompting students to adopt only surface learning), then the utility of entire assessment becomes zero. Let us look at them in some more detail.

Validity

The conceptualization of validity has undergone many changes since the turn of the 20th century. Validity is now considered a unitary concept, synonymous with construct validity [8,9]. It refers to the interpretation that is made from the assessment data and not to the tools that are used. It implies that the assessment must include the 'contents' of the task, which in the context of a given competency, would include knowledge, communication, attitudes, values, etc., in addition to the psychomotor skills.

Points to be kept in mind to enhance the validity of competency assessment include:

1) The role of knowledge in competency assessment

Knowledge is the basic requirement for proceeding further in any educational system; it is especially so in CBME, as it is an important component of competency. Knowledge is the first step in making a clinical diagnosis, which becomes the starting point of any therapeutic intervention. Without a correct diagnosis, no amount of skill proficiency is going to help. Unfortunately, clinical reasoning skills have been put on a backseat due to our newfound emphasis

on skills. There are reports to suggest that students lack the relevant knowledge of commonly taught skills and that proficiency in skills alone doesn't translate into good professional practice [10]. Two other aspects that become important in this context are that experts are experts because they *know more* and not because they can perform more or have specialized skills, [11] and that there is the phenomenon of content specificity which prevents us from generalizing the proficiency in one skill to others [12]. A recent publication has highlighted the role of contextual knowledge and its implications for competency assessment [13]. A lot of voices are also being raised that despite being at the top of Miller's pyramid, performance assessment is not inherently superior in predicting clinical competence [14], and that over-emphasis on skills forces the students to be selective in studying and ignoring the knowledge component [15]. This adverse educational impact threatens validity; it also brings into question the rationale of compensating marks in knowledge with those of clinical/practical or vice versa.

2) The importance of context

Competency assessment must be contextual, especially at the formative and ongoing assessment stage (contrasted to large-scale selection or licensing examinations which strip off the context to ensure comparability between different students). Given the phenomenon of content specificity, [12] it is a bad educational practice, for example, to assess communication at a separate OSCE station. It is the addition of context, that allows us to help the development of level two of competence [1] without which such assessments become only artifacts.

3) Meaningful aggregation of the various attributes

A meaningful aggregation of knowledge, skills, attitudes, communication, and other attributes relevant to the given competency is a key feature of competency assessment. It makes little sense, for example, to club the scores on knowledge of competency "A" with skills of competency "B" and communication of competency "C" and then average out the result. As Schuwirth and Ash [6] put it, *"No doctor would tell his/her patients that their sodium level is too low but fortunately their glucose level is too high and so, on average, they are healthy."* Incorporating a meaningful aggregation in the Indian settings as a blended version of programmatic assessment has earlier been described [16].

Reliability

Reliability is commonly seen as referring to the reproducibility of scores [17]. The important points to be remembered include- first, the fact that reliability is mostly useful for norm-referenced testing (*not* criterion-

referenced as required for CBME), and second, that the clarity of the task decides the degree of reproducibility. Reliability does not co-vary with objectivity, however [18]. The traditional teaching has been that there is no validity without reliability, but it has been repeatedly shown that in practice, there is often a trade-off between validity and reliability [19]. Sample size (tasks, contexts, assessors, and tools) positively influences both, validity, and reliability. The important points to keep in mind to enhance the reliability of competency assessment are as follows:

1) Multiple assessments

If reliability is to be viewed as the degree of confidence that can be placed in the results of our assessment, then there is a need to have multiple assessments. This requires using more assessors for more tasks, in more settings using an assessment toolbox [20], applying the concept of the 'quarter model' to provide a more holistic unbiased picture [21].

2) The role of expert subjective judgments

There should be no shying away from expert subjective judgments for the assessment of domain-independent aspects of professional competence [22]. A common problem with most assessments is the appeal of objectivity to improve 'reliability'. Reliability looks at consistency of marking rather than consistency of performance. There are many flaws in looking at reliability as only reproducibility of results. One is that reliability doesn't co-vary with objectivity, and expert subjective judgments can give as, or even more, reliable results for many tasks [23]. Secondly, by keeping objectivity as one of the criteria, many important 'authentic' measures of doctoring (like communication, professionalism, ethics, empathy, reflections, etc.) get excluded from the assessment process [24]. Thirdly, while objectivity presumes one and only one correct answer, clinical scenarios can have more than one correct answer which may not be objectively assessable. The wheel of assessment has taken a full circle and the importance of contextual expert subjective judgment for CBME is again being recognised [25]. Fortunately, the new curriculum provides for 'only formative' assessments and doesn't require internal assessment marks to be added to final scores, providing a lot of freedom to focus on the educational impact of assessment rather than only on objectivity.

PUTTING THE PRINCIPLES INTO PRACTICE

The inherent difficulty - competencies are acquired incrementally, but assessment must be holistic

Conventionally, the competency statements are end-of-course competencies. However, the process of attaining these competencies is incremental. Say for example the competency of history-taking. The student first learns the basics of communication and the technique of data gathering; then she learns about taking specific history related to various diseases, and then moves on to learning how to elicit sensitive information in a given context, within a specific timeframe, and so on. The teaching is step-by-step, but the assessment has to be integrated, in the sense, that we need to know whether finally, the student will be able to use this competency in a variety of clinical contexts, *habitually and judiciously,* for the benefit of the patients. How to embed a meaningful assessment for this purpose looks like a problem.

How to Circumvent this Problem?

One of the ways to circumvent this problem is to use milestones or Entrustable Professional Activities (EPAs) [26]. However, since our curriculum has not used these concepts, a lot depends on the wisdom of the teachers to match the level of competency acquisition with the level of training. Just as timetables are planned for teaching purposes, assessment tables must be planned, such that the entire spectrum of competency is assessed by the time the course is completed. This can be done only during formative and internal assessment. University examination (or exit examination, when implemented) is not the right place for competency assessment due to the unique nature of competencies. They should be used for quality assurance but not for competency certification.

Choice of Appropriate Tools and the Role of the Assessor

In the initial years of learning (pre-final years), the assessment may be more of knowledge, as it is the foundation on which the competency would be built, along with the assessment of a few basic communication and psychomotor skills, attitude, and professionalism. Theory tests, case presentations, objective structured clinical examination (OSCE), objective structured long examination record (OSLER), assessment in the skills lab, and viva-voce may be used for this purpose. Formative assessment can also be made meaningful by interactions and feedback in classrooms and clinics.

As the students begin engaging more in the clinical context (final year and internship) various workplace-based assessment tools such as direct observation, mini clinical evaluation exercise (m-CEX), and direct observation of procedural skills (DOPS) may be used. As they gradually master cognitive and clinical skills (during PG training), tools such as mini peer assessment tool (m-

PAT), multi-source feedback (MSF), and patient satisfaction surveys (PSF) may be added. At this stage, the assessment predominantly focuses on their clinical performance; however, the assessment of contextual knowledge must continue with the help of case presentations, viva, or theory tests, so that we do not undermine the importance of contextual knowledge as the foundation of clinical performance. Throughout their learning phase, self-assessment, and assessment by logbook and reflections must continue.

Having said that, the assessor is always more important than the tool that is used for competency assessment [27]. The teachers need to use their wisdom not only in the choice of tool - but also in designing the questions and tasks related to each tool so that it is within the context of the competency and not a stand-alone test of knowledge or skill.

CONCLUSION

Before concluding, we would like to recall some aspects of the story of Mahabharata [28] which perfectly illustrates these concepts. The first character which attracts attention is Eklavya [29]. He had mastered the skill of archery to the extent that he could fill the mouth of a barking dog with arrows to silence it but without harming it. But he could not use the divine weapons (like *Brahmastra*, a highly destructive weapon as per legend) nor could he command an army. This was because he learned *shastra* (the skill of using weapons) but not *shaastra* (the science behind weapons and war). Duryodhan [28] was another person, who had learned both *shastra* and *shaastra* but lacked ethics and professionalism. In an era where the opponent had to be invited for a battle and only if he consented could battle take place, Duryodhana wanted to acquire kingdom by defeating Pandavas in the game of dice (*chausar,* a game prevalent in those times). And then there was Arjun, who had learned *shastra* and *shaastra* and was ethical and professional in his approach. He had mastered the skills and learned the use of divine weapons from the best of the teachers and was competent in the true sense. However, just before the war, he declined to use his skills because the *context* changed. His dys-competence, diagnosed and addressed by Krishna, was not due to his lack of knowledge and skills. It was an *expert subjective assessment*, in the true sense, by Krishna as a mentor, who diagnosed his learning needs and made an effective intervention. Indeed, it needed the genius of a Krishna to not send him for another class, skill lab session, course, or fellowship; rather, he helped Arjun to navigate through ethical and professional conflicts and make a decision to act. The entire focus of the discourse between Arjun and Krishna in the form of *Gita* was on positive outcomes, much like the focus of competencies is on being used for the benefit of the patient.

Nothing but these characters from the great epic could have brought out the importance of knowledge, skills, ethics, professionalism, reflections, and training in multiple contexts; their story equally strongly emphasizes the role of an expert teacher and an expert mentor for the success of competency-based education.

Excellent resources are available describing the importance, uniqueness, and other details of competency-based assessment [6,27,30-32]. However, with the above example, we want to reiterate that there is a difference between skills and competencies; and in a CBME curriculum, we should be assessing competencies and not knowledge or skills related learning objectives alone. The purpose of CBME, after all, is not merely to equip the graduate with knowledge and skills but to ensure that the graduate develops the competency to use these for the benefit of the patient and the community.

We could not have found a better way to end this paper than to recall the description of CBME provided by Frank et al [33] on behalf of International CBME collaborators, "CBME is an outcome-based approach to the design, implementation, student assessment and evaluation of medical education programmes using an organising framework of competencies."

REFERENCES

1. Ten Cate O, Khursigara-Slattery N, Cruess RL, et al. Medical competence as a multilayered construct Med Educ. 2024;58:93-104.
2. Epstein RM, Hundert EM. Defining and assessing professional competence. JAMA. 2002;287:226-35.
3. What are competencies? Office of Human Resources. 2017. Accessed Nov 9, 2023. Available from: *https://hr.nih.gov/about/faq/working-nih/competencies/what-are-competencies.*
4. McNeill J. Skills vs. competencies- what's the difference, and why should you care? Viewpoint- careers advice blog. 2019. Accessed Nov 9, 2023. Available from: *https://social.hays.com/2019/10/04/skills-competencies-whats-the-difference*
5. Gruppen LD, Mangrulkar RS, Kolars JC. The promise of competency-based education in the health professions for improving global health. Hum Resour Health. 2012;10:43-46.
6. Schuwirth L, Ash J. Assessing tomorrow's learners: in competency-based education only a radically different holistic method of assessment will work. Six things we could forget. Med Teach. 2013;35:555-9.
7. van Der Vleuten CPM. The assessment of professional competence: developments, research and practical

implications. Adv Health Sci Educ Theory Pract. 1996;1:41-67.

8. Messick SJ. Foundations of validity: Meaning and consequences in psychological assessment. ETS Res Rep Ser. 1993;RR-93-51:1-18

9. Downing SM. Validity: on meaningful interpretation of assessment data. Med Educ. 2003; 37:830-7.

10. Katowa-Mukwato P, Banda SS. Medical students' knowledge of clinical practical procedures: relationship with clinical competence. Creat Educ. 2014;05:1895-1904.

11. Ericsson KA. Deliberate practice and the acquisition and maintenance of expert performance in medicine and related domains. Acad Med. 2004;79:S70-81.

12. Eva KW. On the generality of specificity. Med Educ. 2003;37:587-588.

13. Singh T, Gupta P, Dhir SK. Understanding clinical competence: understanding student assessment. Indian Pediatr. 2023;60:267-71.

14. Norman GE. Inverting the pyramid. Adv Health Sci Educ Theory Pract. 2005; 10:85-88.

15. Epstein RM. Assessment in medical education. N Engl J Med. 2007;356:387-96.

16. Mahajan R, Saiyad S, Virk A, et al. Blended programmatic assessment for competency-based curricula. J Postgrad Med. 2021;67:18-23

17. Downing SM. Reliability: on the reproducibility of assessment data. Med Educ. 2004;38:1006-12.

18. van der Vleuten CPM, Norman GR, De Graaff E. Pitfalls in the pursuit of objectivity: issues of reliability. Med Educ.1991; 25:110-18.

19. Earle S. Balancing the demands of validity and reliability in practice: A case study of a changing system of primary science summative assessment. London Rev Educ. 2020;18: 221-35.

20. Singh T, Saiyad S, Virk A, et al. Assessment toolbox for Indian medical graduate competencies. J Postgrad Med.2021; 67:80-90.

21. Singh T, Anshu, Modi JN. The quarter model: a proposed approach for in-training assessment of undergraduate students in Indian medical schools. Indian Pediatr. 2012;49:871-6.

22. Rotthoff T. Standing up for Subjectivity in the assessment of competencies. GMS J Med Educ. 2018;35:1-11.

23. Virk A, Joshi A, Mahajan R, Singh T. The power of subjectivity in competency-based assessment. J Postgrad Med. 2020;66:200-5.

24. Singh T, Shah N. Competency-based medical education and the McNamara fallacy: assessing the important or making the assessed important? J Postgrad Med. 2023;69:35-40.

25. Ginsburg S, McIlroy J, Oulanova O, et al. Toward authentic clinical evaluation: pitfalls in the pursuit of competency. Acad Med. 2010;85:780-6.

26. Dhaliwal U, Gupta P, Singh T. Entrustable Professional Activities: Teaching and assessing Clinical Competence. Indian Pediatr. 2015;52:591-7.

27. Lockyer J, Carraccio C, Chan MK, et al. Core principles of assessment in competency based medical education. Med Teach. 2017;39:609 16.

28. Basu A. Mahabharata. World History Encyclopaedia. 2016. Accessed Nov 9, 2023. Available from: *https://www.worldhistory.org/Mahabharata/*

29. Pattanaik D. Ekalavya. In: Jaya: An Illustrated Retelling of the Mahabharata. 2010; Penguin Books.pp.64-5.

30. Harris P, Bhanji F, Topps M, et al. Evolving concepts of assessment in a competency-based world. Med Teach. 2017;39:603-8.

31. Bok HG, Teunissen PW, Favier RP, et al. Programmatic assessment of competency-based workplace learning: when theory meets practice. BMC Med Educ. 2013;13:123.

32. Humphrey-Murto S, Wood TJ, Ross S et al. Assessment pearls for competency-based medical education. J Grad Med Educ. 2017; 9:688-91.

33. Frank JR, Snell LS, Cate OT et al. Competency-based medical education: theory to practice. Med Teach. 2010;32:638-45.