



REVIEW ARTICLE

Competency Based Assessment in Paediatric Surgery: Strengths, Challenges, Limitations

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Accepted: 26-December-2023 / Published Online: 7 January 2023

Competency based education (CBE) is a criterion-referenced, outcomes-based framework used for curriculum design and assessment in medical education [1].

The goals of CBE are:

- ❑ To define and assess-
 - Provider competence along a trajectory
 - From novice to expert
 - Using objective performance measures
- ❑ There is a general realization of the need to improvise training directly by engaging with residents, in a certain section of their curriculum-
 - Assessment methods profoundly influence student motivation and effort, it is critical to measure all desired aspects of performance throughout an individual's medical training.

- The proficiencies and aptitudes of professionalism and professional practice in postgraduate education are best taught through direct clinical care as well as simulation and technology enhanced learning (TEL).
- Simulation can allow residents to be put in uncomfortable, high-risk, or difficult environments and give them the ability to act out what they might do in a real situation. They are able to get direct feedback, and re-enact to some of the situations if needed.

- ❑ In the current times, KNOWLEDGE is exploding. The challenge is how to impart meaningful knowledge-

- The twentieth century witnessed the emergence of medical education as a recognized medical discipline, if not a profession. Medicine owes this transformation to a handful of pioneers who dared to challenge the conventional medical education. The initiatives of these individuals were based upon new thinking about education in general that was voiced during the second half of the century and

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- On better understanding of the neuropsychological basis of the learning process. These, together with growing dissatisfaction with contemporary medical education, brought about the efforts to change.
- In sync with the recommendations made by national and international organizations such as-
 - The American Association of Medical Colleges (AAMC),
 - The World Health Organization(WHO), and
 - The World Federation for Medical Education. All of them proposed somewhat similar lines along which medical education should develop

These guidelines have universal application.

□ What the Residents require:

- Residents learn by analysis and synthesis.
- What is going on, and why, are the questions that arise first.
- As the diagnosis develops through clinical and diagnostic implementation the process of synthesis occurs and the picture is put together.
- But, within this paradigm are the features of dealing with complexity and uncertainty:
 - There is not always one correct answer.
 - How do we challenge our trainees who are brought up with their assessments to assume that one answer is correct and the other four are wrong?
- To achieve this, there is a shift towards COMPETENCY- BASED MEDICAL EDUCATION. This is by:
 - Tracking their achievements
 - Making curricula more flexible & relevant
 - Faculty development by more training & support for supervisors.

- Instead of reliance on HIGH STAKE EXIT EXAMINATIONS to constant assessment
- LONGITUDINAL ASSESSMENT relevant to day to day practice
- Essentially, OUTCOMES-BASED training programmes

- The National Board of Examinations in Medical Sciences (NBEMS) recognizes, that, attainment of competence is rarely a linear path for a resident, just as developmental progression is not the same for children:

- Residents learn at different rates,
- Have different strengths, and
- Different areas for improvement.
- These areas for improvement are rarely stable throughout three or four years of residency training.

The lack of inter-rater consistency among faculty is normal and expected.

□ Strengths:

- The NBEMS set up its purposes. A centrally administered, curriculum oriented, outcomes-based approach adopted by the National Board of Examinations in Medical Sciences (NBEMS). These guidelines included, among other recommendations, the following:
 - To set institutional objectives
 - To centralize the administration of resources, including curricular time and content
 - To refocus the orientation from teachers to students
 - NBEMS-App-Enabled guidance, monitoring & assessment

□ Formative Assessment

- Includes various formal and informal assessment procedures by which

evaluation of student's learning, comprehension, and academic progress is done by the teachers/ faculty to improve student attainment.

- Formative assessment test (FAT) is called as "Formative" as it informs the in process teaching and learning modifications.
- FAT is an integral part of the effective teaching.
- The goal of the FAT is to collect information which can be used to improve the student learning process.
- Formative assessment is essentially positive in intent, directed towards promoting learning; it is therefore part of teaching.
- Validity and usefulness are paramount in formative assessment and should take precedence over concerns for reliability.

□ **Competency-based assessment**

- Seeks to align measures of performance directly with desired learning outcomes based upon the needs of patients and the healthcare system:
- Its assessment does not seek to ensure only minimal competence, but rather promotes each learner's trajectory toward excellence across multiple domains of performance.
- It is advantageous to introduce students to the competency domains and milestones early in training and to emphasize the need for continual development throughout one's medical career.

□ **Practice based curriculum: Its advantages are-**

- Students benefit from practice because **they are able to apply knowledge through interaction**

- Students connect with the material when they work with texts and concepts beyond a one-time exposure
- For quality development in post graduate training
- It is a dynamic process
- It engages with the individual to calibrate his performance with the expected outcomes
- Milestone-based assessment has significant potential to guide the development of medical students.

□ **Formative Assessment has Six Domains of core competencies. These are:**

1. Patient Care
2. Medical Knowledge
3. Professionalism
4. Interpersonal and Communication Skills
5. Practice-Based Learning and Improvement
6. Systems-Based Practice

□ **Milestones: The performance levels in each domain is reflected by 3 milestones in each:**

1. Skills,
2. Knowledge &
3. Behaviour

□ **Performance levels in each milestone could be graded as follows:**

1. For Undergraduates:
 - i) novice performance and
 - ii) performance expected of a graduating MD.
2. For Postgraduates:
 - i) novice,
 - ii) advanced beginner,
 - iii) competent individual,
 - iv) proficient individual, and v) expert physician.

□ **The original Pediatric Surgery Milestones** (hereafter referred to as Milestones 1.0) was unveiled in July 2015. Over time, experience using the Milestones 1.0 revealed some of its weaknesses and limitations.

- Five key criticisms were raised
 1. There were too many sub-competencies in many specialties.

2. The Milestones were written in overly complex language.
3. There were too many individual milestones within each subcompetency.
4. Few junior and mid-level faculty were involved in the creation of Milestones 1.0.
5. There was considerable variability across specialties with regard to the non-patient care and non- medical knowledge sub-competencies (interpersonal and communication skills, practice-based learning and improvement, professionalism and systems-based practice).

These differences were thought to interfere with, rather than facilitate, collaboration in assessment and faculty development activities across specialties.

□ **Pediatric Surgery Milestones 2.0**, summarizes key changes from Pediatric Surgery Milestones 1.0 and highlights implications for important stakeholders, viz.:

- Pediatric surgical trainees,
- Faculty at training programs and
- Subsequent employers
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□ **The working group for Milestones 2.0 created eleven Patient Care sub-competencies.** There are Seven intraoperative sub-competencies:

- 1) Endoscopy Procedural Skills,
- 2) Procedural Skills for Minimally Invasive Surgical Procedures,
- 3) Procedural Skills for Thoracic Cases,
- 4) Procedural Skills for Abdominal Procedures,
- 5) Procedural Skills for Oncologic Cases,
- 6) Procedural Skills for Other Operations and Tissue Handling of Delicate and Neonatal Tissue
- 7) Separate sub-competencies were created for Patient Evaluation &
- 8) Clinical Decision-making
- 9) Postoperative Care
- 10) Critical Care and
- 11) Trauma Management.

□ **Challenges:**

- Variability in national educational provisions have constantly been observed.
- There remain major differences in the training, including years of training, exposure to pediatrics & other non-surgical areas during training.
- Exposure to pediatric trauma & pediatric neurosurgery are available only in some institutions.
- These wide variations in pediatric surgical training hinder a more standardized criteria for training and evaluating pediatric surgeons on a global level.

While the National Board imparts its curriculum through its central IT-Hub, the same uniformity could not be found in other programmes in India.

This is the singular feature of the NBEMS.

□ **Limitations:**

- The programmes have fixed period- 3 or 6 yrs.
- If the anticipated level is not achieved within the stipulated time then residency will need to be extended.
- While experience continues to be gained after the degree, the dilemma for course directors to allow appear in EXIT exam will be there.
- Alternatively, desirable and permissible OR independent vs partially dependent grading would be needed.

Conflicts of interest

The authors declares that they do not have conflict of interest.

Reference:

1. Samuel M Alaish, Marjorie J Arca, Brian T Bucher, Cathi Cooney, Diana L Diesen, Peter F Ehrlich, Barbara A Gaine, Cornelia L Griggs, Patrick J Javid, Sanjay Krishnaswami, William Middlesworth. Cynthia L Wong, Laura Edgar. J Pediatr Surg. 2022 May 9; S0022-3468(22)00329-3. DOI: 10.1016/j.jpedsurg.2022.04.021. Online ahead of print. Pediatric surgery milestones 2.0: A primer.