



ROLE OF THE MEDICAL EDUCATION UNIT IN COMPETENCY-BASED MEDICAL EDUCATION (CBME): A COMPREHENSIVE REVIEW

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ABSTRACT

Competency-Based Medical Education (CBME) represents a major transformation in medical education from a predominantly teacher-centred, time-based, and knowledge-oriented system to a learner-centred, outcome-based, and competency-driven approach. In India, the implementation of the Competency-Based Undergraduate Curriculum has increased the need for institutional mechanisms capable of supporting curriculum planning, faculty development, innovative teaching-learning methods, competency-based assessment, educational research, and continuous quality improvement. The Medical Education Unit (MEU) serves as an important academic resource and institutional support system for facilitating these activities. The role of the MEU has expanded beyond conducting isolated faculty development workshops to providing continuous guidance for curriculum implementation, promoting integration, supporting early clinical exposure, facilitating self-directed learning, strengthening skills-based education, improving assessment practices, and encouraging educational scholarship. This review examines the evolving role of MEUs in the implementation and sustainability of CBME in Indian medical colleges. The article discusses the contribution of MEUs to faculty capacity building, curriculum planning, competency mapping, teaching-learning innovations, assessment reform, student support, educational research, and quality assurance. It also highlights the challenges encountered by MEUs, including inadequate infrastructure, shortage of trained personnel, limited protected time, resistance to educational change, variable institutional support, and insufficient longitudinal evaluation of faculty development programmes. Evidence indicates that successful implementation of CBME requires faculty development to be continuous, context-specific, experiential, and supported by feedback rather than limited to one-time workshops. The MEU should therefore function as a permanent academic and quality-improvement body integrated with institutional leadership, curriculum committees, departments, and clinical services. Strengthening MEUs through trained personnel, adequate resources, protected time, institutional authority, educational technology, and outcome-based evaluation can enhance the quality and sustainability of CBME implementation in India.

KEYWORDS: Medical Education Unit; Competency-Based Medical Education; CBME; Faculty Development; Medical Curriculum; Competency-Based Assessment; Indian Medical Graduate; Medical Education.

1. INTRODUCTION

Medical education is expected to prepare graduates who possess not only adequate medical knowledge but also clinical competence, communication skills, ethical values, professionalism, critical thinking, teamwork abilities, and the capacity for lifelong learning. Traditional medical curricula have often emphasized the acquisition and recall of knowledge, with progression largely determined by time spent in training. Although knowledge remains fundamental to medical practice, the increasing complexity of healthcare requires medical graduates to demonstrate the ability to apply knowledge appropriately in clinical and community settings.

Competency-Based Medical Education (CBME) emerged as an educational approach designed to address the limitations of traditional time-based curricula. CBME focuses on clearly defined outcomes and requires learners to demonstrate measurable abilities relevant to professional practice. It emphasizes learner-centred education, integration of knowledge and skills, formative assessment, feedback, reflective practice, and progressive achievement of competencies.

The implementation of CBME in undergraduate medical education in India has brought substantial changes in curriculum design and educational practice. Important components include the Foundation Course, Early Clinical Exposure (ECE), Attitude, Ethics and Communication (AETCOM) competencies, Self-Directed Learning (SDL), horizontal and vertical integration, elective postings, skill-based training, competency-based assessment, and structured documentation through logbooks and portfolios. These reforms require faculty members to adopt educational roles that may differ considerably from conventional lecture-based teaching.

The successful implementation of CBME therefore depends not only on curriculum documents but also on institutional capacity, faculty preparedness, educational leadership, infrastructure, and continuous quality improvement. The Medical Education Unit (MEU) plays a central role in supporting these requirements. MEUs were initially established primarily to promote faculty development and improve teaching-learning practices. Their responsibilities have progressively expanded to include curriculum implementation, assessment reform, educational research, mentoring, quality assurance, and institutional capacity building.

The MEU can be regarded as the academic support system that helps translate the principles of CBME into practical educational activities. It serves as a bridge between national curriculum expectations, institutional leadership, academic departments, faculty members, and students. A well-functioning MEU can facilitate the transition from policy to practice and promote a culture of continuous educational improvement.

2. Concept of Competency-Based Medical Education

Competency-Based Medical Education is an outcome-based approach in which the education of medical students is organized around the achievement of clearly defined competencies. Competencies represent the integrated application of knowledge, skills, attitudes, values, communication, professionalism, and clinical reasoning required for effective medical practice.

CBME differs from traditional education in several important ways. In a conventional curriculum, the focus may be placed on completion of prescribed teaching hours and coverage of subject content. In contrast, CBME emphasizes the achievement and demonstration of desired learning outcomes. The learner is expected to progress through stages of competence with appropriate supervision, assessment, feedback, and support.

The major principles of CBME include:

- Clearly defined competencies and learning outcomes
- Learner-centred education
- Integration of knowledge, skills, attitudes, and values
- Progressive development of competence
- Meaningful assessment of performance
- Frequent formative assessment and feedback
- Individualized learning support
- Emphasis on clinical relevance
- Promotion of reflective practice and lifelong learning
- Accountability to societal and healthcare needs

The Indian CBME curriculum aims to develop the **Indian Medical Graduate (IMG)** who is competent to function as:

1. A clinician
2. A leader and member of the healthcare team
3. A communicator
4. A lifelong learner
5. A professional

The achievement of these roles requires coordinated educational activities across departments and phases of the medical programme. Consequently, CBME cannot be implemented effectively by individual departments working independently. Institutional coordination and educational expertise are required, and the MEU can provide this support.

3. Evolution of Medical Education Units in India

The development of MEUs in India reflects the increasing recognition that medical teachers require formal preparation in educational principles and methods. Traditionally, medical faculty members were appointed primarily on the basis of academic qualifications, clinical experience, and research achievements. Formal training in curriculum design, pedagogy, student assessment, educational psychology, and feedback was often limited.

The establishment of MEUs created institutional structures for improving the educational capabilities of medical teachers. Early activities primarily focused on faculty development programmes involving teaching-learning methods, instructional media, curriculum planning, and student assessment. Over time, the scope of MEUs expanded in response to changes in medical education and increasing expectations for accountability and quality.

The introduction of CBME significantly increased the importance of MEUs. Faculty members were required to understand and implement new educational approaches such as competency mapping, integration, ECE, AETCOM, SDL, skill-based teaching, workplace-based assessment, feedback, reflection, and portfolio-based learning. These requirements created a need for continuous faculty support rather than isolated educational workshops.

Surveys of MEUs in India have identified trained and motivated faculty, supportive institutional leadership, and adequate infrastructure as important strengths. However, limited funding, inadequate infrastructure, lack of full-time personnel, insufficient protected time, and resistance to educational change have also been identified as important barriers.

Thus, the MEU has evolved from a faculty training unit into a broader institutional centre for curriculum support, educational innovation, faculty development, research, and quality improvement.

4. Role of the MEU in CBME Implementation

4.1 Curriculum Orientation and Institutional Preparedness

The implementation of CBME requires a shared understanding of curriculum goals among institutional leaders, faculty members, students, and administrative personnel. The MEU plays an important role in orienting stakeholders to the philosophy, structure, and expected outcomes of CBME.

The MEU may organize:

- Institutional orientation programmes
- Faculty sensitization sessions
- Departmental workshops
- Curriculum review meetings
- Training on competency mapping
- Orientation for newly appointed faculty
- Student orientation programmes
- Academic planning meetings

Faculty members require clarity regarding the relationship between competencies, learning objectives, teaching-learning methods, and assessment. The MEU can help departments translate curriculum requirements into practical academic plans.

A major function of the MEU is to promote a common institutional understanding of CBME. Without shared understanding, different departments may interpret curriculum requirements differently, resulting in inconsistent implementation. Faculty development literature emphasizes the importance of developing shared mental models and supporting faculty through longitudinal rather than one-time educational interventions.

4.2 Faculty Development

Faculty development is one of the most important functions of the MEU. CBME requires faculty members to perform multiple educational roles, including teacher, facilitator, mentor, assessor, feedback provider, curriculum planner, educational researcher, and academic leader.

The MEU can conduct faculty development programmes on:

- Principles of CBME
- Adult learning principles
- Outcome-based education
- Competency mapping
- Writing learning objectives
- Teaching-learning methods
- Small-group teaching
- Problem-based learning
- Case-based learning
- Team-based learning
- Self-directed learning
- Early clinical exposure
- Simulation-based education
- Skill teaching
- AETCOM implementation
- Curriculum integration
- Educational assessment
- Workplace-based assessment
- Feedback and mentoring
- Educational research
- Use of educational technology

Faculty development should not be limited to information delivery. It should provide opportunities for active participation, practice, peer discussion, feedback, reflection, and application in real educational settings.

Studies have shown that faculty members perceive faculty development as essential for successful CBME implementation. Faculty concerns include inadequate staffing, challenges related to integration, limited preparedness for new educational approaches, and the need for adequate infrastructure and training.

Longitudinal faculty development may be more effective than short, isolated workshops. A recent study reported improvement in CBME-related understanding following a structured longitudinal faculty development programme involving repeated sessions and assessment.

The MEU should therefore develop a continuous faculty development pathway that includes orientation, training, supervised implementation, peer observation, feedback, mentoring, and follow-up evaluation.

4.3 Competency Mapping and Curriculum Planning

Competency mapping involves linking curriculum competencies with teaching-learning activities and assessment methods. This process helps ensure that the curriculum is aligned and that students receive appropriate opportunities to learn and demonstrate each competency.

The MEU can support departments in:

- Identifying relevant competencies
- Developing learning objectives
- Mapping competencies to academic sessions
- Selecting appropriate teaching-learning methods
- Planning assessment strategies
- Identifying gaps and unnecessary duplication
- Coordinating competencies across departments
- Monitoring curriculum coverage

A useful curriculum alignment process is:

Competency → Learning objective → Teaching-learning activity → Learning opportunity → Assessment method → Feedback → Documentation

The MEU can guide departments in developing competency-based lesson plans and academic schedules. It can also facilitate institutional curriculum mapping to ensure that competencies are addressed at appropriate levels and that learning experiences are distributed across the programme.

4.4 Facilitation of Horizontal and Vertical Integration

Integration is a major component of CBME. Horizontal integration connects related subjects within the same phase, whereas vertical integration links basic sciences with clinical disciplines across different phases.

The MEU can facilitate integration by:

- Organizing interdepartmental meetings
- Identifying common themes
- Developing integrated teaching modules
- Coordinating shared learning objectives
- Supporting integrated assessment
- Monitoring the implementation of integrated sessions
- Encouraging collaboration among basic and clinical departments

Examples of integrated themes include:

- Cardiovascular physiology, pathology, pharmacology, and clinical medicine
- Endocrine physiology, biochemistry, pathology, and endocrinology
- Nutrition, community medicine, physiology, and paediatrics

- Reproductive physiology, anatomy, obstetrics, and gynaecology

Integration requires collaboration and coordinated planning. The MEU can act as a neutral academic platform that supports communication among departments and prevents integration from becoming merely a collection of unrelated.

4.5 Support for Early Clinical Exposure

Early Clinical Exposure connects basic science learning with patients, clinical practice, and community health from the early stages of medical education. It helps students understand the relevance of foundational knowledge and promotes the development of communication, clinical reasoning, professionalism, and patient-centred attitudes.

The MEU can support ECE by:

- Orienting faculty members to ECE principles
- Developing ECE modules
- Coordinating basic and clinical departments
- Facilitating patient selection and clinical exposure
- Developing student observation guides
- Supporting reflection and feedback
- Evaluating student learning outcomes

ECE should involve meaningful learning experiences rather than unstructured hospital visits. The MEU can help design activities that include preparation, supervised exposure, guided discussion, reflection, and assessment.

4.6 Promotion of Self-Directed Learning

Self-Directed Learning is an important component of CBME because medical graduates must become lifelong learners. SDL encourages students to identify learning needs, establish goals, locate learning resources, select learning strategies, evaluate progress, and reflect on outcomes.

The MEU can train faculty members to:

- Develop structured SDL activities
- Provide appropriate learning resources
- Facilitate student learning without excessive teacher control
- Guide goal setting
- Encourage reflection
- Provide constructive feedback
- Assess learning outcomes

The MEU can also support the development of institutional guidelines for SDL. Structured planning is necessary because merely asking students to study independently does not constitute effective SDL.

4.7 Support for AETCOM and Professional Development

The AETCOM component aims to develop attitudes, ethical values, communication abilities, and professional

behaviour. These competencies require experiential learning, reflection, role modelling, discussion, and feedback.

The MEU can support AETCOM implementation through:

- Faculty sensitization
- Development of case scenarios
- Role-play and simulation
- Small-group discussion
- Reflective writing
- Professionalism assessment
- Communication skills training
- Faculty mentoring

The MEU can also promote a supportive institutional culture because professionalism is learned not only through formal teaching but also through the hidden curriculum. Faculty behaviour, institutional policies, interpersonal relationships, and the learning environment influence students' professional development.

4.8 Development of Teaching-Learning Methods

CBME requires a shift from predominantly lecture-based teaching to a balanced combination of educational methods. The MEU can promote the appropriate use of:

- Interactive lectures
- Small-group discussions
- Case-based learning
- Problem-based learning
- Team-based learning
- Bedside teaching
- Simulation
- Skills laboratory training
- Role-play
- Peer-assisted learning
- Flipped classrooms
- Digital learning
- Reflective exercises

The MEU should help faculty select methods according to learning objectives rather than adopting new methods only because they are innovative. Educational activities should be aligned with the competency and the expected level of performance.

4.9 Strengthening Competency-Based Assessment

Assessment is a critical component of CBME because the achievement of competencies must be demonstrated and documented. Traditional assessment methods often emphasize knowledge recall and may not adequately evaluate clinical performance, communication, professionalism, or practical skills.

The MEU can assist in:

- Developing assessment blueprints
- Aligning assessments with competencies
- Designing valid and reliable assessment tools
- Training faculty in item writing

- Improving multiple-choice questions
- Developing structured practical examinations
- Conducting Objective Structured Practical Examinations (OSPE)
- Conducting Objective Structured Clinical Examinations (OSCE)
- Training faculty in workplace-based assessment
- Developing rubrics and rating scales
- Conducting standard setting
- Reviewing examination quality
- Analysing student performance

Competency-based assessment should use multiple methods and multiple observations. Appropriate tools may include:

- Direct Observation of Procedural Skills (DOPS)
- Mini-Clinical Evaluation Exercise (Mini-CEX)
- Case-Based Discussion (CBD)
- OSCE
- OSPE
- Logbooks
- Portfolios
- Reflective writing
- Multisource feedback
- Structured oral examinations

The MEU can promote the use of formative assessment and feedback. Assessment should not be limited to grading but should guide learning and identify areas requiring improvement.

4.10 Faculty Training in Feedback and Mentoring

Feedback is essential for competency development. Students require timely, specific, constructive, and actionable information about their performance.

The MEU can train faculty members to provide feedback using structured approaches such as:

- Pendleton's model
- Ask-Tell-Ask
- Reflective feedback
- Observation-based feedback
- Feedforward strategies

Faculty should be encouraged to provide feedback based on directly observed performance and clearly identify strengths, areas for improvement, and future actions.

The MEU can also support mentoring systems by developing mentor training programmes and institutional mentoring guidelines. Mentoring can assist students with academic difficulties, professional development, career planning, adaptation to medical education, and personal growth.

4.11 Educational Research and Scholarship

Educational research is necessary to evaluate the effectiveness of curriculum reforms and identify context-

specific solutions. The MEU can promote educational scholarship by providing guidance in:

- Formulating research questions
- Selecting educational research designs
- Developing questionnaires
- Conducting programme evaluation
- Analysing educational data
- Preparing research protocols
- Obtaining ethical approval
- Writing research manuscripts
- Presenting findings at conferences

Possible research areas include:

- Effectiveness of faculty development programmes
- Student perceptions of CBME
- Impact of ECE
- Effectiveness of SDL
- Outcomes of integrated teaching
- Assessment quality
- AETCOM implementation
- Skills laboratory training
- Educational technology
- Learning environment
- Faculty perceptions and preparedness

The MEU can establish educational research groups and encourage collaboration among departments.

4.12 Quality Assurance and Continuous Improvement
CBME implementation should be monitored through systematic evaluation. The MEU can contribute to quality assurance by reviewing educational processes and outcomes.

Important indicators may include:

- Faculty participation in development programmes
- Competency coverage
- Implementation of integrated teaching
- Quality of teaching-learning activities
- Student attendance and engagement
- Assessment quality
- Student performance
- Feedback from students and faculty
- Completion of logbooks and portfolios
- Quality of mentoring
- Educational research output

The MEU can use the **Plan–Do–Study–Act (PDSA)** cycle for continuous improvement:

Plan → Implement → Evaluate → Modify → Reassess

This approach allows educational interventions to be improved using evidence and feedback.

5. Organizational Role of the MEU

A functional MEU requires an appropriate organizational structure and institutional support. The MEU should include trained faculty members representing different

disciplines and should work closely with institutional leadership and curriculum committees.

An effective MEU may include:

- Chairperson or coordinator
- Faculty members trained in medical education
- Representatives from preclinical, paraclinical, and clinical departments
- Educational technology support
- Administrative support staff
- Educational research and assessment expertise

The MEU should collaborate with:

- Institutional leadership
- Curriculum Committee
- Departmental curriculum coordinators
- Assessment Committee
- Academic departments
- Skills laboratory
- Clinical departments
- Student support and mentoring systems
- Research and ethics committees

The MEU should have clearly defined responsibilities, regular meetings, documented action plans, and mechanisms for monitoring outcomes.

6. MEU as a Change Agent

The implementation of CBME represents organizational change. Faculty members may experience uncertainty, increased workload, lack of confidence, or resistance when adopting new educational methods.

The MEU can act as a change agent by:

- Communicating the purpose of CBME
- Creating shared educational goals
- Addressing faculty concerns
- Providing practical training
- Supporting gradual implementation
- Recognizing educational contributions
- Encouraging peer learning
- Sharing successful practices
- Promoting institutional ownership

Change is more likely to be sustained when faculty members understand the educational rationale, receive adequate support, and observe meaningful benefits.

The MEU should avoid functioning only as a regulatory or monitoring body. It should develop a supportive culture in which faculty members can discuss difficulties, seek guidance, experiment with new methods, and improve their educational practices.

7. Challenges Faced by MEUs in CBME Implementation

Despite their important role, MEUs face several challenges.

7.1 Inadequate Human Resources

Many MEUs function through faculty members who have multiple departmental, clinical, administrative, and research responsibilities. Lack of dedicated personnel may limit the continuity and quality of MEU activities.

7.2 Lack of Protected Time

Faculty members may find it difficult to participate in training programmes or implement new educational activities because of heavy teaching, clinical, administrative, and research workloads.

7.3 Inadequate Infrastructure

Limited access to training facilities, educational technology, simulation laboratories, assessment resources, and administrative support may affect MEU functioning.

7.4 Resistance to Change

Some faculty members may prefer traditional teaching and assessment methods. Resistance may arise because of unfamiliarity with CBME, perceived increase in workload, lack of confidence, or uncertainty regarding educational outcomes.

7.5 Variable Faculty Preparedness

Faculty development may be uneven across departments. Some teachers may have extensive training, whereas others may have limited exposure to educational principles.

7.6 Fragmented Implementation

Different departments may implement CBME independently without adequate coordination. This may result in duplication, gaps, inconsistent assessment, and limited integration.

7.7 Excessive Documentation

Logbooks, portfolios, attendance records, competency documentation, and assessment records may create administrative workload if digital systems and adequate support are unavailable.

7.8 Limited Outcome Evaluation

Many faculty development programmes are evaluated primarily through participant satisfaction or pre-test and post-test scores. Long-term changes in teaching behaviour, student learning, and patient-related outcomes are less frequently assessed.

7.9 Insufficient Educational Research

Limited research funding, inadequate methodological expertise, and lack of protected time may reduce educational research activity.

8. Strategies for Strengthening the MEU

The following strategies may improve the effectiveness of MEUs:

8.1 Institutional Recognition

The MEU should be recognized as a permanent academic and quality-improvement body rather than an occasional workshop committee.

8.2 Dedicated Personnel

Institutions should provide trained faculty members, administrative assistance, and educational technology support.

8.3 Protected Time

Faculty involved in MEU activities should receive protected time and appropriate recognition.

8.4 Longitudinal Faculty Development

Faculty development should include repeated training, practical application, peer observation, mentoring, feedback, and follow-up evaluation.

8.5 Departmental Educational Coordinators

Each department may appoint a faculty coordinator to communicate with the MEU and facilitate curriculum implementation.

8.6 Educational Technology

Digital learning platforms, electronic portfolios, online assessment systems, virtual simulation, and learning analytics may improve educational efficiency.

8.7 Educational Research Support

The MEU should provide methodological guidance and encourage faculty to conduct educational research.

8.8 Outcome-Based Evaluation

MEU activities should be evaluated using multiple outcomes, including:

- Faculty knowledge
- Teaching behaviour
- Quality of educational activities
- Student learning
- Assessment quality
- Curriculum implementation
- Institutional improvement

8.9 Recognition and Incentives

Faculty contributions to education should be recognized through awards, academic credit, promotion criteria, certificates, and institutional incentives.

9. Future Directions

The future role of MEUs should extend beyond faculty training to institutional educational leadership. Important future directions include:

9.1 Digital and Technology-Enabled Education

MEUs can support:

- Learning management systems
- Virtual classrooms
- Digital portfolios

- Online assessment
- Simulation-based education
- Artificial intelligence-assisted learning
- Learning analytics

9.2 Competency Dashboards

Digital dashboards may help institutions monitor competency coverage, assessment performance, faculty participation, and student progress.

9.3 Faculty Coaching

MEUs can develop faculty coaching systems in which trained educators provide individualized support to teachers.

9.4 Interprofessional Education

Future healthcare requires collaboration among doctors, nurses, pharmacists, physiotherapists, and other health professionals. MEUs may support interprofessional education and teamwork.

9.5 Educational Leadership Development

MEUs can train faculty members in curriculum leadership, change management, conflict resolution, communication, and institutional quality improvement.

9.6 National and Regional Collaboration

Networking among MEUs can promote sharing of educational resources, standardized training, multicentric research, and collaborative innovation.

9.7 Evidence-Based Educational Practice

MEUs should use educational evidence to guide institutional decisions and evaluate the outcomes of CBME implementation.

10. CONCLUSION

The Medical Education Unit is central to the successful implementation and sustainability of Competency-Based Medical Education in India. The role of the MEU extends beyond conducting faculty development workshops and includes curriculum planning, competency mapping, faculty capacity building, integration, early clinical exposure, self-directed learning, AETCOM implementation, assessment reform, mentoring, educational research, quality assurance, and institutional change management.

The transition to CBME requires continuous faculty support because the curriculum introduces new educational roles and responsibilities. Faculty development should therefore be longitudinal, experiential, context-specific, and supported by feedback and mentoring. The MEU should function as an institutional academic resource that promotes collaboration among departments and ensures alignment between competencies, teaching-learning activities, assessment, and educational outcomes.

Challenges such as limited infrastructure, inadequate staffing, lack of protected time, resistance to change, variable faculty preparedness, and insufficient outcome evaluation must be addressed. Strengthening MEUs through institutional authority, dedicated personnel, educational technology, faculty incentives, protected time, and evidence-based quality assurance can improve the implementation of CBME.

A well-supported MEU has the potential to transform medical colleges into learning organizations that continuously evaluate and improve their educational practices. The future success of CBME in India will depend substantially on the capacity of MEUs to provide sustained educational leadership, faculty development, research support, and quality improvement.

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