

INTEGRATION IN MEDICAL EDUCATION THROUGH HARDEN'S LADDER

ABSTRACT:

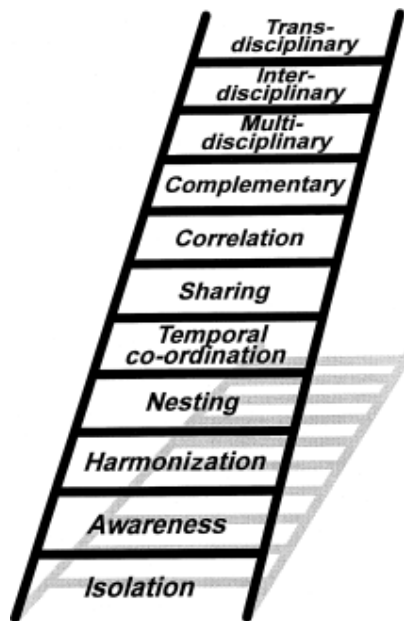
The new curriculum differs from the older one by being more learner and patient centric, outcome based, aligned & integrated, and emphasis on skill development. Ethics, communication and affective domains shall be addressed explicitly. Newer additions like foundation course, early clinical exposure and self-directed learning are introduced.^[1] The curriculum implementation support programme is making tremendous efforts in inculcating the new curriculum into day to day teaching. The curriculum committee has a huge task to train the faculty in their respective colleges for a smooth transition. Hence, a thorough understanding of the new curriculum by these members is very essential.

Key words: Integration, CBME, Harden's ladder

INTRODUCTION:

Integration in the context of Competency-Based Medical Education (CBME) refers to the alignment of competencies across different domains and their incorporation into educational programs. This integration involves ensuring that the essential knowledge, skills, and attitudes required for effective clinical practice are interconnected and complementary within the curriculum. Integration means aligning competencies with educational activities, assessments, and learning outcomes to ensure that learners develop a comprehensive set of skills necessary for their future roles as healthcare professionals. It involves connecting various components of education to create a cohesive learning experience that promotes the acquisition of core competencies.^[1]

Professor Ronald M Harden was a renowned medical educationist with an immense contribution to the field. He has described the 11 steps in integration, which is called the Harden's ladder. Subject / Discipline – based teaching at the lower four levels of the ladder and moving up the ladder, the emphasis is on integration across several disciplines. In the last step of the ladder, it's the responsibility of the student to integrate in a given situation.^[3,4]



STEP 1: ISOLATION

The subjects are taught in isolation without considering as to what is being taught in other subjects.

EXAMPLE:

1st year disciplines:

the topics scheduled-

Department of Anatomy:

Cardiovascular system

Department of Physiology: Endocrine system

Department of Biochemistry: Metabolic diseases.

Here, one can see that there is no alignment of any topics and no attention is paid to related subjects

^[1]. The major disadvantage is that the students don't develop any relationship between subjects when taught in isolation^[5].

STEP 2: AWARENESS

The teaching is again subject based, but the teacher is aware of what is taught or being taught in other subjects. EXAMPLE:

Dept. of Physiology:

Physiology of thyroid glands - synthesis, secretion, transport, physiological actions, regulation and effect of

altered (hypo and hyper) secretion of thyroid hormones. Dept. of Biochemistry - The functions of the thyroid,

the tests that are commonly done in clinical practice to assess the functions thyroid gland, abnormalities of thyroid glands.

These topics will be dealt at different time frames and there is no concurrence. Here, an overlap of functions and abnormalities of the thyroid gland is obvious. In awareness, the teacher in one subject is made aware of what is covered in other subjects in the curriculum. The teacher can take account of what colleagues cover in other parts of the course when planning teaching, avoiding redundancy and cross-referring. But there is no explicit attempt to provide integrated view of the subject to the student. Awareness may be through documentation/lecture notes/handouts that are made available to the teacher. So during planning, the teacher **may** plan to avoid repetitions and stress on other aspects. ^[3,4, 5]

STEP 3: HARMONIZATION

The faculty from concerned departments consult through informal discussions between teachers or through curriculum planning committees. This encourages teachers to adapt their programs so that each course makes an appropriate contribution to the curriculum and the overall curriculum objectives are more likely to be achieved.

EXAMPLE: Dept of
Microbiology: Discuss the clinical evolution, etiopathogenesis and the laboratory diagnosis of malaria.
Dept of Pathology: Define and
describe the pathogenesis and pathology of malaria. Both these topics are taught at different time frames.

The staff in Dept. of Pathology make reference to malaria in brief and refresh the memory of what is learnt in microbiology during their topic on infections & infestations. Thus, an explicit connection with topics already learnt in other subjects is made. ^[4,5]

STEP 4: NESTING

The teacher tries to bring in concepts from other subjects within a subject based course. It could be the clinical skills/concepts brought into a pre, paraclinicals subjects or a basic skill introduced in clinicals subjects. ^[1,3,4]

This concept enriches the teaching in one subject.

EXAMPLE 1:

Dept of Biochemistry: Tests that are commonly done in clinical practice to assess the functions of liver.

In the above class a relevance to clinical practice is introduced through - A case of alcoholic liver disease may be discussed during this class to bring in relevance of LFTs.

EXAMPLE 2:

Dept of **Obstetrics** & gynaecology: changes in the genital tract, cardiovascular system, respiratory, haematology, renal and gastrointestinal system in pregnancy.

In the above class, a relevance to basic knowledge/skill is introduced through - A discussion on normal physiology of the above systems before proceeding to the changes in pregnancy.

STEP 5: TEMPORAL COORDINATION:

The related organ systems or topics/diseases in subjects are scheduled around the same time. This is done in consultation with other disciplines. Though the concepts in each subject are learnt separately, the students have a high scope to relate the concepts and learn. ^[1,3,4]

EXAMPLE FOR ORGAN SYSTEMS:

Dept of Anatomy: Anatomy of the heart.

Dept of Physiology: Properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions.

Dept of Biochemistry: Basis and rationale of biochemical tests in cardiovascular systems.

EXAMPLE FOR TOPICS/ DISEASE:

Dept of Pathology: Etiopathogenesis and **pathology** of myocardial infarction.

Dept of Pharmacology: Anti angina drugs.

The topic of heart is scheduled at the same time in the time table, so that the students can correlate better.

STEP 6: SHARING.

Two disciplines come together and share a class so as to avoid repetitions. Such sharing of classes is effective and efficient in imparting knowledge/skills to the students.

EXAMPLE:

Dept. of Physiology:	Physiology of liver function.
Dept. of Biochemistry:	Metabolism of bilirubin.

Since, these two topics have many overlapping specific learning objectives, the SLOs may be clubbed together and a common consensus arrived at. The SLOs

may be divided among the staff of respective departments depending on the importance in their subjects. Then the staff in each discipline may come together and teach in the same class.^[1,3,4,5]

STEP 7: CORRELATION:

The topics

are dealt are subject or discipline based and they take up most part of the curriculum time. In a separate session on correlation, only areas of common interest are brought together. EXAMPLE:

Dept. of Anatomy: Anatomy of Pancreas (1 hr) Dept. of Physiology: Physiology of pancreas (1hr)
Dept. of Biochemistry: biochemical changes by pancreatic hormones (1hr)
HORIZONTAL INTEGRATION CLASS: Case of Diabetes/diabetic coma/complications – is used as a linker for the integration class (2 Hrs.) with contribution from all the 3 departments
In a single session, all the three disciplines should come together and will stress on the importance of the above topics with regard to diabetes. The facilitators shall avoid teaching again the topics on pancreas but stress the role of pancreas only in diabetes. During assessment questions are more focused on topics covered in individual subject class rather than on integration class.^[1,4,5]

STEP 8: COMPLEMENTARY

This type of integration is both subjected based as well as integrated. The focus of teaching is a theme or topic to which the disciplines will contribute. The teaching is subject based and in individual classes the focus is on the theme (not on the subject as in correlation). Running parallel to these individual classes is an integrated class where each subject teacher shall emphasize on the theme so that the student has a holistic approach to the theme. Individual subjects are given less importance in terms of time, resources and assessment.^[1,3,4]EXAMPLE:

Theme: Diabetes in pregnancy
Subject based classes are conducted individually in different departments: Dept. of **Obstetrics** & gynaecology – incidence, management and complications of DM in pregnancy (1 hr)
Dept. of Pediatrics: management of neonates born to diabetic mothers (1 hr)
Dept. of community medicine: burden of DM in the community. (2 hr) Dept. of Medicine: recent advances in the treatment of DM (1hr)
Complementary teaching session on Theme ‘Diabetes in Pregnancy’ (8 hours): A case of Gestational diabetes is used and various departments discuss around the theme in detail. During assessment, questions are based on integrated session rather than on individual sessions. In contrast to correlation which is subject based and each topic is dealt in detail and a common session brings in the relevance with a linker, the complementary integration places importance to the theme.

STEP 9: MULTIDISCIPLINARY:

The topic is not dealt subject-based and it transcends subject boundaries. In one session the staffs from various departments imparts knowledge as much necessary for the theme. Courses are developed around systems. The scenarios a professional may have to deal in real time may be considered for such integrations.^[1,3,4] For example: In the thyroid module of the endocrine system block, the contributions from different departments may be as follows: Dept. of Physiology: to thyroid hormone synthesis and its regulation, Dept. of Pathology: to the underlying patho-physiology of the processes, Dept. of Pharmacology: to the action of anti-thyroid drugs, Dept. of Surgery: to the management of goitre, and

Dept. of Medicine: to the clinical manifestations and investigations of thyroid disease.

With this kind of approach a student has a good idea of what to expect and how to go about when cases of thyroid land on his table. CMEs where talks are arranged around a particular theme are examples of such

4multidisciplinary integration. EXAMPLE: Topic of CME: Diabetes^[5]

Dept. of Biochemistry: Regulation of blood glucose

Dept. of Pathology: Pathophysiology of Diabetes

Dept. of Medicine: Management of Diabetes and complications

Dept. of Surgery: Diabetic Foot management

Dept. of OBG: Gestational diabetes

Dept. of Pediatrics: Diabetes in children

STEP 10: INTERDISCIPLINARY:

It is a study of a phenomenon that involves the use of two or more academic disciplines simultaneously. This is a higher level of integration where the content of all or most subjects is combined into a new course. There is no subject demarcation in this level.^[3,4] EXAMPLE: Approach to acute abdomen: A case of acute abdomen in middle aged women is used as linker. Departments of Medicine, Surgery and OBG will discuss their approach towards diagnosis and management of that particular case without any subject demarcation. Emergency medicine (initially started as a course, only in the recent past was started as a degree) where there is no demarcation between the two subjects of medicine and anaesthesia and is an amalgamation of the above two mentioned disciplines. Another example being courses like geriatric medicine, laboratory medicine etc.

STEP 11: TRANSDISCIPLINARY:

This is the highest level of integration. The emphasis is here on knowledge as exemplified in real world. It is the responsibility of the student to integrate all that is learnt in different disciplines in a real life situation.

^[3,4]**EXAMPLE:**

When an intern sees a case of MI in emergency, he integrates his knowledge of various disciplines like: Dept of Anatomy: anatomy of the heart. Dept of

Biochemistry: Biochemical markers for diagnosis of MI

Dept of Pathology: pathophysiology and investigations in a case of myocardial infarction Dept of

Pharmacology: drugs used in MI Dept of Medicine: management of a case of MI.

With this understanding during the various phases, the student should be able to manage a case of MI during internship^[5].

As we climb up the Harden's integration ladder, there is less emphasis given to individual subjects and more emphasis on achieving the goal of holistic approach of medical education.

CONCLUSION:

Alignment and Integration being an integral part CBME curriculum requires thorough understanding of different levels of integration for effective implementation of new curriculum. It needs more training and clarity in this aspect to all medical educators, as it requires faculty from across phases to work inco-ordination to make it effective and relevant.

Harden's ladder provides a valuable framework for understanding the stages of medical education and the progression of learners from novice to expert. In the context of Competency-Based Medical Education (CBME), the ladder can serve as a guide for designing curricula and assessment methods that align with the principles of competency-based learning.

REFERENCES:

1. Medical Council of India. Alignment and Integration Module for Undergraduate Medical Education Program, 2019: 1- 34.
2. <http://edo.med.miami.edu/grand-rounds/schedule-2017-2018>.
3. Atwa HS, Gouda EM. Curriculum integration in medical education: theoretical review. Intel Prop Rights 2014; 2: 113.doi:10.4172/ipr.1000113.
4. Harden RM. The integration ladder: a tool for curriculum planning and evaluation. Med Edu 2000; 34:551.
5. Hamsaveena, Rashmi MV. An Attempt to Understand the Different Levels of Harden's Ladder. JMSH 2022; 8(1): 88-92.