

# Examination Reforms for Quality Enrichment in Higher Education

*With special reference to physics subject*

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**Abstract :** Evaluation plays a vital role in education. Education without a proper evaluation system is of little use. Evaluation system helps in finding learners' abilities and difficulties. Evaluation system in higher education in India has kept on changing. Education should imbibe an all-round development of a learner. But our higher education system evaluates a student (learner) based on his/her performance in semester end examinations. Educationists, academicians, researchers have brought many new ideas like continuous and comprehensive evaluation (CCE) system to change the classical evaluation system. We have to eradicate the old rote learning methods through the modern methods. Without a quality evaluation system we cannot improve the quality of higher education. Reforming the quality of examination can strengthen students with creative and critical thinking. The present paper aims to bring a positive change in the higher education system by proper implementation of the necessary evaluation system according to the needs of the curriculum as well as the students. Also it will delineate some evaluation techniques which can be used to enrich the quality education in higher education.

**Keywords -** Evaluation, critical thinking, higher education, curriculum, cce

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## I. INTRODUCTION

Evaluation is an integral part of teaching-learning process. Teaching-learning process has specific aims and objectives. Through evaluation we can find how far our aims and objectives have been reached. Only certain parts of the curriculum get wide attention by the students and teachers which have weightage in examination system in many cases. There is a need for reforming examination system in higher education in present scenario. In order to maintain consistency in teaching-learning process, teachers as well as students should be engaged actively in the classroom. For this one should possess determination as well as dedication. Evaluation helps in finding the students' understanding of the subjects which the teacher has taught.

Evaluation of students through proper methods of assessment leads in finding learning difficulties in them as well as the level up to which the students have grasped the concepts. It should be followed by remedial classes so that it will bring slow learners in par with their peers in teaching-learning process. In classical evaluation system, teachers have to wait for the semester to complete in order to assess whether the students have learnt the concepts or not. By providing only assignments do not make them active learners rather they may copy the things from the available resources. Continuous and Comprehensive Evaluation (CCE) helps in evaluating students using different tools at each point of time throughout the semester and at the end of the semester.

## II. TOOLS OF EVALUATION SYSTEM

There are different tools of evaluation such as

1. Written Test
2. Quiz
3. Assignment
4. Project work

### 5. Activities or experiments related to some topics in the syllabus etc.

Written tests are used to check the knowledge and understanding of the concepts. They comprise of short answer type (SA) as well as long answer type (LA) questions. Quizzes mainly consist of MCQs and fill in the blanks questions. Assignments are generally homework which consist LA, SA etc. Project works mainly given to students to explore new ideas which are related to their syllabi and perform some experiments or field work. Some small activities or experiments related to certain topics in the syllabus.

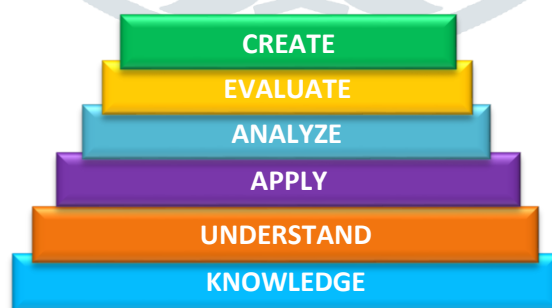
### III. BLOOM'S TAXONOMY

Bloom's Taxonomy provides an important framework to design appropriate examination questions belonging to various cognitive levels together with the designing of curriculum and teaching methodologies. Bloom's Taxonomy of Educational Objectives developed in 1956 by Benjamin Bloom (Bloom, 1956) was widely accepted by teacher educators as well as researchers for curriculum design and assessment. In 2001, Anderson and Krathwohl modified Bloom's Taxonomy (Anderson et al, 2001) to make it relevant to the present-day requirements. It attempts to differentiate learning into three types of domains (cognitive, affective, and behavioral) and then defines the level of performance for each domain. The study of these domains helps to aim for higher-level abilities which go beyond remembering or understanding, and require application, analysis, evaluation or creation.

Revised Bloom's taxonomy identifies six levels of competencies within the cognitive domain (Table 1, Figure 1) which are appropriate for the purposes of educators.

**Table 1 Revised Bloom's Taxonomy, levels of cognitive domain (Ashok S S et al., AICTE)**

Level	Descriptor	Level of attainment
1	Remembering	Recalling and recognizing from memory of previously learned concepts
2	Understanding	Explaining and interpreting concepts
3	Applying	Using learnt concepts in solving problems
4	Analysing	Classifying information to better understanding
5	Evaluating	Assessing or judging a decision or conclusion
6	Creating	Developing or designing new ideas, products or new ways of viewing things



**Figure 1 Revised Bloom's Taxonomy (Ashok S S et al., AICTE)**

### IV. PRESENT EXAMINATION SYSTEM IN UNDERGRADUATE PHYSICS OF UNIVERSITY OF MYSORE

In present examination system, written examination play a major role in evaluating students' learning and awarding grades to the student. Universities and Colleges give importance to the outcomes of the semester end written examination. Written examinations assess the limited range of learning outcome. It is not sufficient to assess students' learning. The present examination mainly concentrates on only two cognitive levels out of six viz., Knowledge and Understanding. Application part is very lightly considered in the evaluation system. The Table 2 shows the examination pattern of undergraduate physics question paper (Theory) of University of Mysore.

Table 2 Examination Pattern of Undergraduate Physics Question Paper of University of Mysore

Maximum Marks: 80				Time: 3 hours	
Sl. No	Section	Type of question	Number of questions to be attempted	Marks Allocated to each question	Total Marks
1	A	Long Answer Questions	2 out of 3	12	24
2	B	Long Answer Questions	2 out of 3	12	24
3	C	Numerical Problems	3 out of 4	04	12
4	D	Short Answer Questions	10 out of 12	02	20

A maximum mark allocated is 100 which is the sum of marks allocated for semester end examination (80) and internal assessment marks (20). Internal assessment mark is awarded by conducting two tests one in the 8<sup>th</sup> week and other in 16<sup>th</sup> week of the semester.

By looking at the Table 2 we can see that there will be only concentration towards the knowledge and understanding (Section A and B) since only long answer type questions will be asked in these sections, they promote rote memorization of the theoretical derivations which has to be eradicated by using suitable techniques. Application part is used to solve numerical problems (Section C). Short answer questions asked in Section D will include knowledge, understanding and very little amount of analyzing levels. There is no possibility for students to use his or her skills to create new ideas or design new experiments throughout the semester.

#### V. AN EXAMPLE OF MODEL EXAMINATION SYSTEM

In order to promote student engagement in learning throughout the semester we should use Continuous and Comprehensive Evaluation (CCE) in higher education. The following techniques of evaluation will be used in the curriculum for better learning outcome.

- **Diagnosis test at the beginning of the Semester:** Before starting the chapter or unit, the teacher should know about the students' previous knowledge on that topic. Suppose the teacher is willing to teach Elasticity chapter in undergraduate physics, He or She should check whether the students have the prior knowledge about elasticity topic which they have learnt in the pre-university physics classes. For this, teacher has to conduct diagnosis test on elasticity topic which can have multiple choice questions (MCQ), fill in the blanks, true or false type, and short answer type questions etc. After conducting the diagnostic test teacher will evaluate the test papers and finally come to conclusion that at which level his or her students have understood as well as remember the concepts on elasticity. Now teacher can plan for the necessary ways of teaching methods to make students to clear understand about the particular concept.
- **Bridge course:** After evaluating diagnosis test, teacher comes to an idea that conducting short term bridge course for making students to recall and remember the concepts which can frame the basis for present syllabi. Also it helps in finding which type of teaching strategies can be helpful in teaching-learning process.
- **MCQs with reasoning:** Multiple Choice Questions without reasoning provide multiple options so that students have to choose one of the given options. There is a probability for students to choose correct option without knowing the exact answer. Therefore instead of using only MCQs we can use MCQ with reasoning so that students have to

write the reason why the selected option is correct for the given question. Equal weightage will be given for choosing correct option as well as correct reason while assessment.

- **MCQs with multiple answers:** MCQs with multiple correct answers can be used to verify whether the student thoroughly understood the concepts or not. They will help students to apply their knowledge in answering these types of questions.
- **Weekly Quizzes:** Conducting weekly quizzes on the topics taught in that week will emphasize reflection of the learning outcome. They provide essential feedback for the teaching. So that by conducting periodic quizzes make teaching-learning process interactive and promotes co-operation between teachers and students. Weekly quizzes include MCQs with reasoning, MCQs with multiple answers; fill in the blanks, short answer type questions.
- **Assignments:** Assignments containing brief literature review of the topics included in the syllabus should be given to students. So that students get awareness about the important discoveries or inventions of different theories as well as instruments or experiments. The study of history of development of concepts of physics in chronological order will help better understanding of the present scenario of the physics in the global picture.
- **Analytical Problems:** Instead of giving only numerical problems, include analytical problems, reasoning based problems, to evaluate students' skill in applying their knowledge. Numerical problems promote remembering of only certain formulae and substitution of numerical values to particular parameters. By using analytical problems in exams will help in verifying proper understanding of the concepts. There is no possibility of rote memorization.
- **Activity based curriculum:** Peer groups of students will be formed in the classroom and they will be assigned for doing simple and easy project works. So that it will promote students to creative thinking as well as using technical skills in designing or doing experiments related to syllabus.
- **Semester end examination:** At the end of the semester students will be evaluated by providing examination which consists of MCQs with reasoning, short answer type questions, analytical problems and long answer type questions.

Students will be evaluated throughout the semester and at the end of the semester. The total grading will depend on weekly quizzes as internal assessment tests, assignments, project work and semester end examination. The weightage for semester end examination is 70% of the total marks. Long answer type question consist of deriving important relations among different parameters. Analytical problems include short mathematical calculations which require proper understanding and necessary skill to apply that information in solving problems. Very short answer type questions will be asked to verify conceptual understanding. Multiple Choice Questions with suitable distractors will be asked which seek proper reasoning for the selected option. Correct option and correct reason carry 0.5 marks each for a particular question. Weightage for Internal assessment is 30%, which include scores from weekly quizzes normalized to 20%, ten weekly quizzes should be conducted in the semester. The question paper pattern for weekly quiz is as discussed above. Weightage for assignment or simple project work is 10%. Two assignments will be given to the students in each semester. Table 3 and Table 4 depict the question paper pattern.

**Table 3 Example of model Examination Pattern of Undergraduate Physics Question Paper**

Maximum Marks: 70			Time: 3 hours		
Sl. No	Section	Type of question	Number of questions to be attempted	Marks Allocated to each question	Total Marks
1	A	Long Answer Questions	3 out of 5	12	18

2	B	Long Answer Questions	3 out of 5	12	18
3	C	Short Answer Questions Analytical Problems	3 out of 4	04	12
4	D	Very Short Answer Questions	6 out of 6	02	12
5	E	MCQs with reasoning	10 out of 10	01	10

Table 4 Sample Blueprint

Subject: Heat, Thermodynamics and Sound											Class: I B.Sc			
Time: 3 hours														
Maximum Marks: 70														
Sl. No	Chapter or Unit	Knowledge				Understanding				Application and Analyze				Total
		LA	SA	VSA	MCQ	LA	SA	VSA	MCQ	LA	SA	VSA	MCQ	
1	Kinetic Theory					6(1)		2(1)	1(1)		4(1)			13
2	Thermal Conductivity	6(1)			1(1)									7
3	Radiation			2(1)						6(1)			1(1)	9
4	Low Temperature Physics	6(1)						2(1)	1(1)					9
5	Thermodynamics					6(1)			1(1)		4(1)			11
6	Entropy			2(1)					1(1)	6(1)	4(1)			13
7	Thermodynamical Potentials									6(1)			1(1)	7
8	Sound				1(1)	6(1)					4(1)			11
9	Analysis of Complex Waves			2(1)						6(1)			1(1)	9
10	Superposition of SHM					6(1)		2(1)	1(1)					9
Sub Total		12(1)		6(3)	2(2)	24(4)		6(3)	5(5)	24(4)	16(4)		3(3)	98(30)
Total		20(7)				35(12)				43(11)				
The numbers in the parenthesis denotes number of questions and number outside the paranthesis indicates marks allocated to single question														

Sample blue print is prepared for complete question paper including choices. The students have to attend the questions from each section as provided in the Table 3.

## VI. LIMITATIONS AND CHALLENGES FOR REFORMING EXAMINATION

The model evaluation method discussed above has merits with the following shortcomings.

1. Implementation of the discussed evaluation criteria needs permission from the policy makers.
2. Since internal assessment quizzes to be conducted weekly, there may be a problem of allotment of time for conducting quizzes in all the subjects.
3. The discussed methods engage students throughout the semester, but for some of the students think that it is cumbersome.

## VII. CONCLUSION

The present evaluation techniques do not fulfill all the cognitive levels of revised Bloom's taxonomy. The aim of Higher Education system in the present scenario is developing skills together with developing knowledge in the students for youth empowerment. Creativity should not be suppressed by knowledge. In order to do that the present evaluation system should be reformed according to needs of the learners.

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