

# AN EMPIRICAL STUDY ON MEASURING ATTAINMENT OF COURSE OUTCOMES AND PROGRAM OUTCOMES OF B.ED. PROGRAM AS PER SELF-ASSESSMENT REPORT-JUNE 2015

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**Abstract:** The National Board of Accreditation (NBA) has released a modified version of the self-assessment report (SAR) for institutions in the country. Twelve different criteria with regard to Bachelor of Education has been considered in this paper. These criteria rigorously assess the quality of B.Ed. program offered by National Council of Teacher Education. Criterion 3 assesses the attainment of program outcomes (POs) through attainment of course outcomes (COs). Different approaches have been adopted by educational institutions for the measurement of attainment of COs and POs prior to June 2015 SAR format. Also, criterion 7 depends to a large extent and criterion 2 to some extent on criterion 3. Hence, it is required to measure the attainment of COs and POs as per the guidelines of SAR June 2015 format. This paper presents a simplified approach for the measurement of attainment of COs and POs. The approach can be extended to measure the attainment of Program Specific Outcomes (PSOs) also. Sample course is considered for showing the measurement of attainment of COs and POs.

**Keywords:** Self-Assessment Report, Attainment of Course Outcomes, Program Outcomes, B.Ed. Program.

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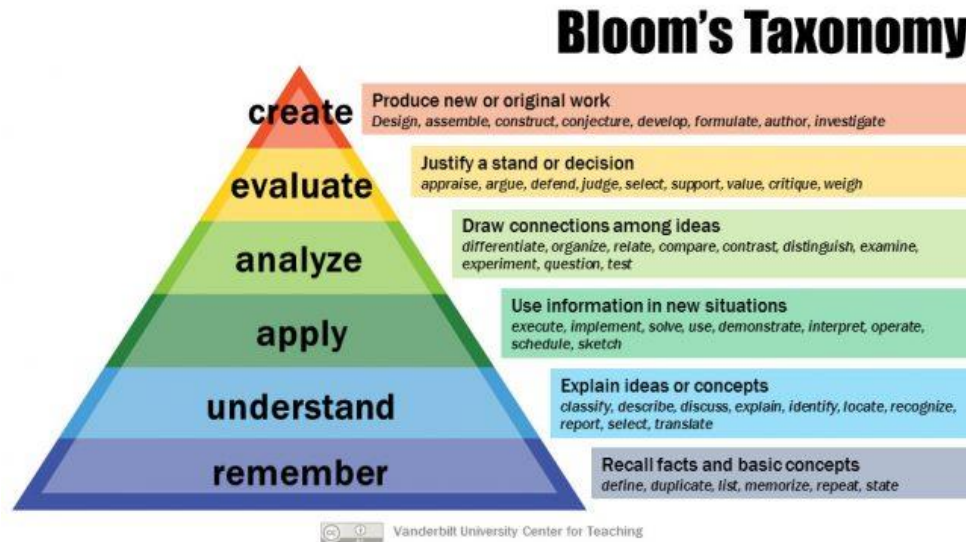
## 1. INTRODUCTION

Teacher Education involves training student teachers and preparing for a professional role as a reflective practitioner. Teacher Education has gaining its momentum in the present scenario as the National Policy of Education says that the future citizens are being shaped in the classrooms. National Board of Accreditation (NBA) is one of the platforms that provides a framework to bridge the 'academic-schools gap' and enables better employment prospects for teaching graduates. NBA insists on 'Outcome Based Education' which has published its guidelines and principles in Teaching Programs to conduct 'Self-Assessment' to improve the quality of education. The guidelines help the institutions to improve their teaching learning process to meet the global standards of teacher education. One of the important criteria is about measuring the attainment of course outcomes (CO), program outcomes (PO) and program specific outcomes (PSOs) and the program outcomes and course outcomes have to be formulated according to the particular program.

Assessment methods are categorized into two as direct method and indirect method to access Course Outcomes and Program Outcomes. The direct methods display the student knowledge and skills from their performance in the internal assessment tests and semester examinations. The indirect method done through alumni surveys which reflects their views on students' learning. In this paper, direct assessment method and indirect assessment method are considered for 80% and 20% respectively. Internal test assessment and end semester examination assessment are considered with the weightage of 50% each for the direct assessment of Course Outcomes.

## 2. ATTAINMENT OF COS AND POS

The process of attainment of Cos, POs and PSOs starts from writing appropriate Course Outcomes for each course of the program from first year to second year in a two-year B.Ed. degree program. The course outcomes are written by the respective faculty member using action verbs of learning levels suggested by Bloom and Anderson which is given below.



Then, a correlation is established between COs and POs in the scale of 1 to 3 in the following manner.

- If the difference between the CO and PO is 0, then the outcome is 3 which represents **high** level.
- If the difference between the CO and PO is 1, then the outcome is 2 which represents **moderate** level.
- If the difference between the CO and PO is 2, then the outcome is 1 which represents **low** level.
- If the difference between the CO and PO is 3 or more than 3, then the outcome is 0 which represents **not up to the level**.

A mapping matrix is prepared in this regard for every course in the program including the elective subjects. The course outcomes written and their respective mapping with POs are reviewed frequently by senior faculty members before they are finalized. The following tables show the COs and the CO-PO mapping matrix for a sample course.

## 3. VISTAS

School of Education

Program Name : B.Ed. (2016-2018)

Course Name : Education in Contemporary India

Semester : I

Course Code : 16GCED11

Table 1: Course outcomes

At the end of this course, the student will be able to:

CO. No	K-level	Course outcomes
		Students will be able to
CO101.1	K4	Examine the educational problems in contemporary Indian society
CO101.2	K5	Differentiate education in pre and post independent India
CO101.3	K4	Appraise various Indian Constitutional provisions and education commission
CO101.4	K3	Formulate the objectives and need of value education

Table 2: Mapping of Course outcomes and program outcomes

PO→	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	2	3	-	-	-	-	-	-	-
CO2	1	2	3	3	3	-	-	-	-	-	-	-
CO3	2	3	2	2	3	-	-	-	-	-	-	-
CO4	3	2	1	2	3	-	-	-	-	-	-	-
Avg.	2	2.5	2	2.25	3	-	-	-	-	-	-	-

PO – Program Outcomes

CO - Course Outcomes

From the mapping matrix of COs and POs for all the courses as above, a “Program level course – PO matrix’ of all the courses including first year courses is prepared. Table-3 shows “Course-PO” mapping matrix.

Table 3: Program level Course - PO Matrix for all the courses including first year courses

VISTAS												
School of Education												
Programme Name: B.Ed (2016-2018)												
Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C101	2	2.5	2	2.25	3	-	-	-	-	-	-	-
C102	2.5	2.5	1.5	1.5	3	-	-	-	-	-	-	-
C103	2	2.5	2	2	2	2	-	-	-	-	-	-
C104	2	2	1.5	1.5	2.75	-	-	-	-	-	-	-
C105	2.25	2.25	1.75	1.75	3	1.75	-	-	-	-	-	-
C106	1.5	2	2	2	2.75	2	-	-	-	-	-	-
C107	1.5	2	2	2	2.75	-	-	-	-	-	-	-
C201	2	2.5	2	2.25	3	-	-	-	-	-	-	-
C202	-	2	2.5	2.5	2.75	-	2.75	-	-	-	-	-
C203	1.25	2.5	2.75	2.75	2.75	1.25	-	-	-	-	-	-
C204	2	2.5	2	2	3	-	2	-	-	-	-	-
C205	1.5	2.25	2.25	2.25	3	1.5	-	-	-	-	-	-
C206	1.75	2.75	2.25	2.25	2.25	-	-	-	-	-	-	-
C207	2.5	1.5	0.5	-	2.5	2.5	-	-	-	-	-	-
C208	1.25	2.25	2.25	2.25	3	1.25	-	-	-	-	-	-
C301	2	2.5	2	2.25	3	-	-	-	-	-	-	-
C401	2.25	2.25	1.75	1.75	2.75	-	-	1.75	-	-	-	-
C402	2.5	2.5	1.5	1.75	2.5	-	-	-	-	-	-	-
C403	2.25	2.25	1.75	1.75	3	-	-	-	-	-	-	-
C404	2.25	2.25	1.75	1.75	2.25	-	-	-	-	-	-	-
C405	-	-	-	-	2	-	-	-	-	2.25	2.25	2.25
C406	-	-	-	-	2	-	-	-	2	2	-	-
C407	1.25	2.25	2.25	2.25	2.75	1.25	-	-	-	-	-	-
C408	-	2	2	2	2	-	2	-	-	-	-	-
CPR1	2.75	2.25	-	-	-	-	-	-	-	-	-	-
CPR2	-	-	-	-	-	-	-	-	3	3	3	3

#### 4. ATTAINMENT OF COS

Course Outcomes are narrower statements that describe what students are expected to know, and be able to do at the end of each course. These relate to the skills, knowledge and behaviour that students acquire through the course. In a university, the CO attainment levels can be measured based on the results of the internal assessment and external examination conducted by the university. This is a form of direct measurement of attainment. In our B.Ed. course, there will be two internal assessment tests namely CAT I and CAT II are conducted for each course in a semester. For computing overall course outcome attainment level, 50% of the CAT I & II and 50% of the University Examination grades are taken. In each test, the percentage of students who achieve a set target (usually, 60% of the maximum marks, i.e. 15 out of 25) for the COs that are covered is calculated.

Thus, the average of percentage of students attaining all the COs decides the CO attainment level. For the case sample considered, in the internal assessment tests, the target attainment level for each CO and for each student is set at 60% of the maximum marks for a group of questions. The percentage of student attaining this target level of each COs is computed and the average of these percentages is considered for deciding the attainment level of course outcome. The process of computing CO attainment in internal assessment is shown in the following table.

TABLE 4: Percentage of students attaining course outcomes and attainment level

VISTAS SCHOOL OF EDUCATION											
SUBJECT CODE						16GCED11					
SUBJECT NAME						EDUCATION IN CONTEMPORARY INDIA					
		CAT - I		ATTAINMENT LEVEL		CAT - II		ATTAINMENT LEVEL		UE	TL
		CO1	CO2	ATTAINMENT LEVEL	TL	CO3	CO4	ATTAINMENT LEVEL	TL	CO1 - CO4	
		10M	15M	25M	>=60%	10M	15M	25M	>=60%	10GPA	>=60%
S.No.	Reg. No.										
1	16511101	7	8	15	Y	8	9	17	Y	8	Y
2	16511102	7	9	16	Y	7	10	17	Y	7	Y
3	16511103	9	14	23	Y	7	13	20	Y	9	Y
4	16511104	10	11	21	Y	9	10	19	Y	9	Y
5	16511105	6	12	18	Y	7	13	20	Y	9	Y
6	16520101	8	10	18	Y	8	11	19	Y	7	Y
7	16520102	7	9	16	Y	6	9	15	Y	6	Y
8	16520103	8	9	17	Y	8	10	18	Y	7	Y
9	16520104	8	11	19	Y	8	9	17	Y	6	Y
10	16520105	8	10	18	Y	6	10	16	Y	5	N
11	16520106	5	11	16	Y	8	7	15	Y	6	Y
12	16520107	8	10	18	Y	9	10	19	Y	7	Y
13	16520108	7	8	15	Y	9	9	18	Y	5	N
14	16520109	6	8	14	Y	9	8	17	Y	6	Y
15	16520110	9	12	21	Y	8	12	20	Y	7	Y
16	16520111	7	8	15	Y	5	11	16	Y	7	Y
17	16520112	6	11	17	Y	6	12	18	Y	7	Y
18	16520113	9	12	21	Y	9	13	22	Y	7	Y
19	16520114	8	8	16	Y	6	9	15	Y	6	Y
20	16520115	9	14	23	Y	9	13	22	Y	7	Y
21	16520116	5	7	12	N	6	5	11	N	6	Y
22	16520117	AB	AB	AB	NA	AB	AB	AB	NA	RA	NA
23	16520118	4	9	13	N	5	10	15	Y	6	Y
24	16520119	6	10	16	Y	6	9	15	Y	6	Y
25	16520120	9	13	22	Y	8	13	21	Y	7	Y
26	16520121	4	8	12	N	6	4	10	N	5	N
27	16513101	8	12	20	Y	9	14	23	Y	7	Y
28	16513102	7	4	11	N	7	11	18	Y	6	Y
29	16513103	8	10	18	Y	7	10	17	Y	7	Y
30	16514101	5	7	12	N	4	6	10	N	7	Y
31	16514102	6	7	13	N	7	13	20	Y	7	Y
32	16514103	6	9	15	Y	5	5	10	N	5	N
33	16514104	5	10	15	N	4	12	16	Y	7	Y
34	16515101	6	3	9	N	5	4	9	N	5	N
35	16515102	7	9	16	Y	6	11	17	Y	7	Y
36	16515103	7	9	16	Y	7	10	17	Y	7	Y
37	16515104	4	12	16	Y	6	14	20	Y	7	Y
38	16515105	7	9	16	Y	7	10	17	Y	7	Y
39	16515106	5	8	15	Y	7	9	16	Y	6	Y
40	16515107	AB	AB	AB	NA	AB	AB	AB	NA	RA	NA

41	16515108	9	13	21	Y	8	12	20	Y	8	Y
42	16518101	8	9	17	Y	8	10	18	Y	7	Y
43	16518102	6	10	16	Y	4	14	18	Y	7	Y
44	16518103	8	9	17	Y	8	10	18	Y	7	Y
45	16518104	4	13	17	Y	8	12	20	Y	7	Y
46	16518105	4	12	16	Y	4	12	16	Y	6	Y
47	16518106	8	12	20	Y	8	11	19	Y	9	Y
48	16518107	6	12	18	Y	8	9	17	Y	7	Y
49	16518108	5	12	17	Y	3	6	9	N	6	Y
50	16518109	8	11	19	Y	8	10	18	Y	8	Y
51	16518110	7	9	16	Y	8	9	17	Y	7	Y
52	16518111	8	14	22	Y	8	7	15	Y	8	Y
53	16518112	6	12	18	Y	6	10	16	Y	8	Y
54	16518113	6	10	16	Y	6	9	15	Y	7	Y
55	16518114	7	7	14	N	5	12	17	Y	8	Y
56	16518115	7	8	15	Y	7	9	16	Y	7	Y
57	16518116	6	7	13	N	4	6	10	N	6	Y
58	16519101	6	10	16	Y	6	9	15	Y	6	Y
59	16519102	7	12	19	Y	5	10	15	Y	7	Y
60	16519103	7	11	18	Y	6	11	17	Y	7	Y
61	16519104	6	11	17	Y	7	10	17	Y	7	Y
62	16519105	6	4	10	N	6	9	15	Y	5	N
63	16519106	6	9	15	Y	7	10	17	Y	7	Y
64	16519107	7	10	17	Y	9	9	18	Y	7	Y
65	16522101	8	10	18	Y	8	9	17	Y	9	Y
66	16522102	8	11	19	Y	9	9	18	Y	9	Y
67	16522103	6	8	14	N	7	8	15	Y	8	Y
68	16522104	7	8	15	Y	8	10	18	Y	9	Y
69	16522105	7	9	16	Y	6	11	17	Y	7	Y
70	16523101	6	8	14	N	7	8	15	Y	7	Y
71	16523102	7	11	18	Y	8	9	17	Y	8	Y
72	16523103	7	12	19	Y	7	12	19	Y	9	Y
73	16523104	6	8	14	N	4	8	12	N	7	Y
74	16523105	7	9	16	Y	5	12	17	Y	5	N
75	16523106	6	8	14	N	6	9	16	Y	7	Y
76	16523107	7	8	15	Y	8	7	15	Y	7	Y
77	16523108	6	7	13	N	6	9	15	Y	6	Y
					Y-57				Y-66		Y-68
					N-16				N-8		N-7
					NA - 4				NA - 2		NA - 2
<b>Avg. of Course Outcome Attainment</b>					<b>0.74</b>				<b>0.85</b>		<b>0.88</b>
<b>Overall Course Outcome &gt;= 60%</b>					<b>2.75</b>	→	<b>(2.5X 0.5 + 3 X 0.5 = 2.75)</b>				
<b>Attainment Level</b>											
<b>TL - Target Level</b>						<b>Y - TL Achieved</b>			<b>0.5 - 50% of CAT</b>		
<b>CAT - CONTINUOUS ASSESSMENT TEST</b>						<b>N - TL Not Achieved</b>			<b>0.5 - 50% of UE</b>		
<b>AVG. AVERAGE</b>						<b>NA - Not Applicable</b>		<b>UE.</b>		<b>UNIVERSITY EXAMINATION</b>	

Using the above table, and the overall course attainment levels of all the courses, the PO attainment values are computed. As per the guidelines given by the senior faculty members, the target was reduced to 40% (i.e. a student should score 40% marks or more for attaining a CO). The attainment levels are then modified as

**Attainment Level 1:** 60% of students scoring more than 40% of maximum marks.

**Attainment Level 2:** 70% of students scoring more than 40% of maximum marks.

**Attainment Level 3:** 80% of students scoring more than 40% of maximum marks.

From the above table, it is found that 88% of students scored more than 40% of maximum marks and hence the CO attainment level in University Examination is 3.

### Overall Course Outcome Attainment

The overall CO attainment level in the course considered is computed as follows:

Overall CO attainment level = 50% of CO attainment level in IA tests + 50% of CO attainment level in University Examination. Therefore, Overall CO attainment level =  $2.5 \times 0.5 + 3 \times 0.5 = 2.75$ .

The above procedure of computing overall CO attainment is to be repeated for each course from first year to final year in an academic year in order to enable computation of PO attainment levels.

**Table 5: Programme outcome attainment values**

VISTAS													
School of education													
Programme Name: B.Ed (2016-2018)													
Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	Overall CO Attain
C101	1.87	2.33	1.87	2.10	2.80	-	-	-	-	-	-	-	2.8
C102	2.33	2.33	1.40	1.40	2.80	-	-	-	-	-	-	-	2.8
C103	1.67	2.08	1.67	1.67	1.67	1.67	-	-	-	-	-	-	2.5
C104	2.00	2.00	1.50	1.50	2.75	-	-	-	-	-	-	-	3
C105	1.88	1.88	1.46	1.46	2.50	1.46	-	-	-	-	-	-	2.5
C106	1.40	1.87	1.87	1.87	2.57	1.87	-	-	-	-	-	-	2.8
C107	1.25	1.67	1.67	1.67	2.29	-	-	-	-	-	-	-	2.5
C201	2.00	2.50	2.00	2.25	3.00	-	-	-	-	-	-	-	3
C202	-	1.67	2.08	2.08	2.29	-	2.29	-	-	-	-	-	2.5
C203	0.96	1.92	2.11	2.11	2.11	0.96	-	-	-	-	-	-	2.3
C204	1.53	1.92	1.53	1.53	2.30	-	1.53	-	-	-	-	-	2.3
C205	1.00	1.50	1.50	1.50	2.00	1.00	-	-	-	-	-	-	2
C206	1.34	2.11	1.73	1.73	1.73	-	-	-	-	-	-	-	2.3
C207	2.08	1.25	0.42	-	2.08	2.08	-	-	-	-	-	-	2.5
C208	1.04	1.88	1.88	1.88	2.50	1.04	-	-	-	-	-	-	2.5
C301	2.00	2.50	2.00	2.25	3.00	-	-	-	-	-	-	-	3
C401	2.25	2.25	1.75	1.75	2.75	-	-	1.75	-	-	-	-	3
C402	2.50	2.50	1.50	1.75	2.50	-	-	-	-	-	-	-	3
C403	1.73	1.73	1.34	1.34	2.30	-	-	-	-	-	-	-	2.3
C404	1.73	1.73	1.34	1.34	1.73	-	-	-	-	-	-	-	2.3
C405	-	-	-	-	1.87	-	-	-	-	2.10	2.1	2.1	2.8
C406	-	-	-	-	1.53	-	-	-	1.53	1.53	-	-	2.3
C407	1.25	2.25	2.25	2.25	2.75	1.25	-	-	-	-	-	-	3
C408	-	2.00	2.00	2.00	2.00	-	2.00	-	-	-	-	-	3
CPR1	2.75	2.25	-	-	-	-	-	-	-	-	-	-	3
CPR2	-	-	-	-	-	-	-	-	3.00	3.00	3.00	3.00	3
Direct PO attain	1.74	2.00	1.68	1.78	2.33	1.42	1.94	1.75	2.27	2.21	2.55	2.55	
Indirect PO attain	2.84	2.77	2.82	2.7	2.62	2.59	2.67	2.61	2.59	2.59	2.7	2.66	
Overall PO attain	1.960381	2.157188	1.904	1.965397	2.384278	1.6505	2.087333	1.922	2.331333	2.286889	2.58	2.572	
Target set	1.5	2	1.5	1.5	2	1.5	2	1.5	2	2	2	2	

The above table shows the PO attainment through direct and indirect method. Target value for attainment of each PO deferred with each other. Before setting target value for PO, senior faculty members should be consulted. A special action plan for the subsequent year may be designed and implemented to the PO's which didn't reach the target attainment values in the previous year.

Using Table 4 and the overall course attainment levels of all the courses, the PO attainment values are computed as shown in Table 5.

#### Sample computation of PO values:

- Cell number C101-PO1: PO attainment value = (Corresponding cell value from Table 3 x Overall CO attainment value for course C101)/3 =  $(1.87 \times 2.8) / 3 = 1.74$

- Cell number C103-PO5: PO attainment value = (Corresponding cell value from Table 3 x Overall CO attainment value for course C103)/3 =  $(2 \times 2.5)/3 = 1.66$

As per the guidelines of the SAR, the overall attainment of outcomes of a program (POs) is computed by adding direct attainment and indirect attainment values in the proportion of 80:20. That is 80% of direct attainment and 20% of indirect attainment is taken into consideration.

The direct attainment of POs is the average of individual PO attainment values. From table 5, the direct attainment of PO1 is  $(1.87+2.33+1.67+2+1.88+1.40+1.25+2+0.96+1.53+1+1.34+2.08+1.04+2+2.25+2.50+1.73+1.73+1.25+2.75)/21 = 1.74$ . The direct attainment of other POs is computed in this manner and is shown in the table. For determining indirect attainment of POs, SAR suggests student exit surveys, employer surveys, co-curricular activities, extracurricular activities, etc. In this paper, student exit survey alone is considered for this indirect assessment purpose. A questionnaire was designed for this purpose and the average responses of the outgoing students for each PO is computed and entered in the corresponding row of Table 5. Finally, overall PO attainment values are computed by adding direct and indirect PO attainment values in the proportion of 80:20 respectively. The computed values are compared with the set target values of POs. The target values are set in consultation with the management committee members and the senior faculty members of our School of Education. It is argued that the target PO attainment value for each PO must be different since the contribution of courses for PO attainment is different. Accordingly, each PO was set with different target value as shown in the last row of Table 5. It is found from the table that all the POs are attained. An action plan for POs that do not reach the target attainment value must be designed and implemented in the subsequent academic year. Criterion 7 of the SAR deals with target values of POs, and action plans needed for attaining POs whose attainment values are less than the set target values.

## 5. CONCLUSION

Criterion 3 'self-assessment report' of National Board of Accreditation is an important criterion and is an input for criterion 7. The criterion gives an indication of how a program is performing in terms of attainment values of course outcomes and program outcomes. In this paper, the course outcomes and program outcomes for B.Ed. program have been found and compared with the set target attainment values. It is observed that the overall program attainment value is greater than the target attainment value. Hence, it can be concluded that B.Ed. program of our institution VISTAS has reached the set target attainment level.

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