# A Journey with the Evolution of Accreditation Processes of NBA India

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**ABSTRACT**

NBA has been assisting the stakeholders in engineering education to identify those institutions and their specific programmes, which meet the norms, standards and criteria prescribed by Washington Accord. The processes of NBA had been reviewed many times since its inception in September 1994 to make it more effective. Various revisions in the years 2000, 2003, 2004, 2009, 2011, 2013 and 2015 are being reviewed in this paper. Descriptive comparisons, statistical analyses like Principal component analysis and Logistic regression are used for assessing the revisions. The revisions of initial years indicate a positive shift from resource perspective to process perspective. Outcome orientation in assessment is the essence of recent revisions of NBA.

**Keywords:** Accreditation Process, NBA Criteria, Outcome based Assessment.

## INTRODUCTION

A complex set of factors including social aspirations, growth of Indian industry and the increase in the global demand for technical human resources resulted in a steep increase in the growth of technical institutions in the last three decades in India. This unprecedented growth obviously led to several problems with regard to quality of technical education. In order to ensure the quality of technical education and to take advantage of globalization of economy, All India Council for Technical Education (AICTE) has established National Board of Accreditation (NBA). National Board of Accreditation (NBA) is charged with the task of evolving a procedure for assessment of quality in the technical education sector in India on the basis of specified guidelines, norms, benchmarks and criteria [1].

## EFFECTIVENESS OF ACCREDITATION PROCESS OF NBA – EARLIER STUDIES

An effective accreditation mechanism should be able to demarcate between a good and a bad programme without any bias or preconceived notions of the assessor. This should be achieved through the analysis of variability of performance of programmes in various well-defined dimensions of quality. Moreover, the process should be as objective as possible to avoid the criticisms about the correctness of the decision. Studies were conducted to analyze the effectiveness of NBA process.

## Data Description

Score sheets prepared by the NBA expert team, a confidential document, which is not accessed by the public, of 200 Undergraduate programmes were collected. Pure random sampling is difficult when dealing with such confidential data. To ensure the randomness of the samples, three Sectorial Committee reports of 49 programmes belonging to ten different colleges of eight different states of India, assessed by different expert teams during the period 2000 - 2001 were collected and tabulated.

## Principal Component Analysis on NBA Criteria

Our interest is to find out whether the 8 criteria can be reduced to a smaller number of linear functions (principal components) of these criteria, which can best summarize the original process. Principal Component Analysis (PCA) is used for this purpose of data reduction and summarization. To support this decision, Scree test criterion and Percentage of variance criterion are also used [2]. In the social sciences (as in the present research), where information is often less precise, a solution that accounts for 60 percent of the total variance is considered satisfactory [3]. Only one component emerged from the analysis with eigen value greater than 1. Around 63 % of variability is explained by this single component (Table 1).

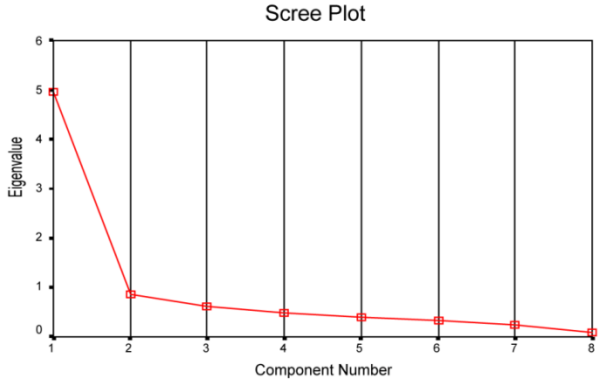


**Fig. 1:** Scree plot of Principal Component Analysis on NBA Criteria

**Table 1:** Principal Component Analysis on the 8 criteria of NBA

| *Criteria* | *Coefficients (Component 1)* |
|---|---|
| .Mission, Goals and Organization | .88 |
| Financial & Physical Resources and their Utilization | .85 |
| Human Resources: Faculty& Staff | .85 |
| Human Resources: Students | .79 |
| Teaching – Learning Processes | .78 |
| Supplementary Processes | .74 |
| Industry – Institution Interaction | .74 |
| Research & Development | .69 |
| Eigen value | 5.02 |
| Percentage of Variance | 62.73 |

The Principal Component Analysis indicated that the eight criteria considered to be the essential dimensions of NBA evaluation process actually represent only a single component 'Overall Performance of the Programme' or NBA process was actually one dimensional.

## Prediction of Accreditation Status – Logistic Regression Approach

Criteria scores of the 160 programmes are used for building the model. The eight criteria of NBA are taken as the independent variables for model building. Accreditation status (Accredited – 0 and Not-Accredited – 1) of engineering programmes is the dependent variable in the model. Over the last decade the logistic regression model has become, in many fields, the standard method of analysis in this type of situations [4]. The best model equation in terms of classification result was ***Logit (p)*** = ***18.34 - 0.01 * Teaching-Learning Processes*** with a predicted overall accuracy of 94.3 %. ie, a model, which includes only a single independent variable, can predict the accreditation status with good accuracy [5].

## Findings from the Studies

- There appears to be one dominant component, which may be called the 'Overall Performance of the Programme', that captures much of the discriminatory power of all the eight criteria of NBA.
- With the determination of a single criterion score, it is possible to predict the accreditation chance of the programme with sufficient accuracy.

## Earlier Revisions of NBA Accreditation Processes – A Comparison

NBA reviewed its accreditation process and modified the same. The first set of changes was introduced with effect from 1-1-2003 [6], and the second set of changes was introduced with effect from 1-1-2004 [7]. Some more changes have been made to the scoring sheets of NBA in 2005 [8]. The grading system has changed from 'A, B, and C' classification to 'Accredited for 5 years and

**Table 2:** Revisions of NBA Accreditation Processes

| *Initial System* | | *2004 Version* | |
|---|---|---|---|
| *Criteria* | *Wts* | *Criteria* | *Wts* |
| 1. Mission, Goals and Organization | 100 | 1. Organization and Governance | 80 |
| 2. Financial & Physical Resources and their Utilization | 100 | 2. Same | 70 |
| | | 3. Physical Resources (Central Facilities) | 50 |
| 3. Human Resources: Faculty& Staff | 200 | 4. Same | 200 |
| 4. Human Resources: Students | 100 | 5. Same | 100 |
| 5. Teaching – Learning Processes | 350 | 6. Same | 350 |
| 6. Supplementary Processes | 50 | 7. Same | 50 |
| 7. Industry – Institution interaction | 70 | | |
| 8. Research & Development | 30 | 8. Research & Development and Interaction Effort | 100 |
| **Total** | **1000** | **Total** | **1000** |

3 years' in the 2003 revision. The minimum requirement for accreditation has increased from 550 points to 650 points in this revision. In the second revision, which came into effect from January2004, minimum standards (50%) for the 3 critical criteria - HR –Faculty, HR- Students and Teaching Learning Process are introduced. Total number of variables to be assessed is reduced from 70 to 57 in this revision. More weight is given to the institute level performance than the department level performance in this version. While the total number of criteria has been kept at eight and the total weight at 1000, the names and weights of individual criteria are modified in this revision (Table 2).

In 2005, NBA made the assessment more objective by specifying the grading system for different levels of programme performance [8].

## SHIFT TO OUTCOME BASED ASSESSMENT

While resources and processes are essential components of any programme, the outcomes that result from their successful utilization are much more important. Most of the accreditation boards for engineering programmes around the world give more importance to the outcomes in their assessment process. The main criteria for their processes are the clear definition of the 'Programme Educational Objectives' and the achievement of the 'Programme Outcomes'. The criteria of the Accreditation Board for Engineering and Technology [9] of United States, Engineering Council of UK [10], Japan Board of Accreditation of Engineering Education [11], Institution of Professional Engineers New Zealand [12] and Accreditation Board for Engineering Education of Korea [13] are examples. But, the NBA accreditation process gave less importance to the 'Outcomes'. NBA had given 50 % weight to processes (500 marks), 41 % to resources and only 9 % to the outputs. The conclusions from the studies mentioned earlier point to the necessity for a shift in the framework for the assessment of quality of engineering programmes.

### Inclusion of Outcomes in Assessment – 2009 Version

NBA was trying to become a full signatory of Washington Accord, which is an agreement for mutual recognition of degree level programmes within the countries, since 2007. As a prelude to this, NBA had included a criterion (criterion VIII) for outcome assessment in its revised process in 2009. The revised criteria [14] are given in the Table 3.

**Table 3:** Accreditation Criteria 2009 Revision

| *Criterion Descriptor* | *Max. Points* | *Qualifying Points* |
|---|---|---|
| I. Organization and Governance, Resources, Institutional Support, Development and Planning | 150 | 100 |
| II. Evaluation and Teaching-Learning | 175 | 115 |
| III. Students' Entry and Outputs | 150 | 100 |
| IV. Faculty Contributions | 150 | 100 |
| V. Facilities and Technical Support | 75 | – |
| VI. Continuous Improvements | 75 | – |
| VII. Curriculum | 125 | – |
| VIII. Program Educational Objectives – Their Compliance and Outcomes | 100 | – |
| **Total** | **1000** | |

## Outcome Based Education and Assessment – 2011, 2013, 2015 versions

Though NBA had included Criterion 8 for outcome orientation in assessment in the 2009 revision, it was not at par with that of its counter parts in other parts of the world, especially the full signatories of Washington Accord. As instructed by the mentors of Washington Accord, the entire criteria were reinvented to suit Outcome Based Education and Assessment (OBE&A) and led to the 2011 version of NBA criteria [15]. This is illustrated in Table 4. Here, the first three criteria are related to OBE&A. If a programme gets a total score of 750 or more and minimum of 60 % in all the criteria the decision will be 'Accredited for next 5 years'. If the programme gets a total score of 600 or more the decision will be 'Provisionally Accredited' for next 2 years. The Program gets the status 'Not Accredited' if it gets the score less than 600.

To become a signatory member of the WA, NBA is restructured as an autonomous body and a robust accreditation system was implemented by the NBA [16]. A two tier accreditation system had been developed, Tier 1 for autonomous programmes and Tier 2 system for non-autonomous programmes. The assessment and evaluation process of accreditation of an engineering programme is based on 9 broad criteria (Table 5).

NBA announced a New Self Assessment Report (SAR) format for non-autonomous Institutions (Tier-II Institutions), with effect from June, 2015 [17]. The new system made the SAR more illustrative with examples and explanations. Some more criteria have been included, some changes in scores have been incorporated and separate scores have been included for institutional data. These changes are illustrated in Table 6.

**Table 4:** NBA criteria from 2011

| *Part I : Institutional Summary* | *Score* |
|---|---|
| I. Organization and Governance, Resources, Institutional Support, Development and Planning | 100 |
| II . Teaching and Learning Processe | 100 |
| III . Students' Admission and First Year Performance | 75 |
| *Part II : Program Summary* | |
| IV . Students' Performance in the Program | 75 |
| V. Faculty | 150 |
| VI . Facilities and Technical Support | 75 |
| VII . Continuous Improvements | 75 |
| VIII . Curriculum | 100 |
| IX . Program Educational Objectives (PEOs) | 150 |
| X . Program Outcomes and Assessment | 100 |
| **Total** | **1000** |

**Table 5:** Criteria 2013

| *Criterion* | *Max. Points* |
|---|---|
| 1. Vision, Mission and Programme Educational Objectives | 75 |
| 2. Programme Outcomes | 150 |
| 3. Programme Curriculum | 125 |
| 4. Students' Performance | 100 |
| 5. Faculty Contributions | 175 |
| 6. Facilities and Technical Support | 125 |
| 7. Academic Support Units and Teaching-Learning Process | 75 |
| 8. Governance, Institutional support and Financial Resources | 75 |
| 9. Continuous Improvement | 100 |
| **Total** | **1000** |

**Table 6:** Comparison 2015 with 2013 version

| *Criteria name* | *Score - 2013* | *Score – 2015* | *Changes* |
|---|---|---|---|
| I. V, M, PEO | 75 | 60 | • V, M, PEO COMBINED<br>• Achievement & redefining of PEOs removed |
| II. Programme curriculum & TLP | 165 | 120 | New approach |
| III. COs & POs | 150 | 120 | New approach |
| IV. Students' Performance | 100 | 150 | • Academic Performance in each year<br>• Placement and Higher Studies- equal wts |
| V. Faculty Information & Contributions | 175 | 200 | • Innovations by the teachers in Teaching and Learning – New<br>• Teacher Performance Appraisal and Development System – New<br>• Visiting/Adjunct Faculty – New |
| VI. Facilities & Technical Support | 125 | 80 | • Laboratories to meet requirements – New format |
| VII. Continuous Improvement | 100 | 50 | • Actions taken– New, elaborate<br>• Improvement in admission quality – new |
| VIII. First year Academics | 35 | 50 | New criteria, Institute level |
| IX. Student Support System | | 50 | New criteria, Institute level |
| X. Governance, Institutional support & Financial Resources | 75 | 120 | Almost same , Institute level |
| **Total** | | **1000** | **1000** |

## CONCLUSIONS

Earlier versions of NBA processes had some drawbacks. The process has been reviewed many times since its inception to make it more effective. The revisions of initial years of 2000 indicate a positive

shift of assessment from resource perspective to process perspective. An attempt to reduce subjectivity from the process was also visible in those revisions. But the basic weaknesses of NBA processes like lack of outcome orientation remain unattended till 2013. This factor is being incorporated in the latest versions 2013 and 2015. As in any system, improvements are still possible in NBA processes to make the accreditation more effective for the continuous improvement of quality of education.

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