Survey on Institution Accreditation and Automation System

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Abstract: Education refers to the knowledge, insights, and skills inherited by students from teachers. An Outcome Based Education (OBE) system can measure the students' capabilities and performance. The National Board of Accreditation (NBA) is the supreme accreditation body for Engineering and Management Programs in India. This paper is based on Criteria 3 of the Self Assessment Report (SAR) for NBA. Criteria 3 is focused on the attainment of Course Outcomes (COs) and Program Outcomes (POs) by a department and its courses as a part of Outcome-based Education (OBE).

1   INTRODUCTION

In Higher Education, particularly in technical institutions, Outcome Based Education (OBE) is deemed to improve the quality of education, allowing graduates to compete against global counterparts. OBE is an educational approach that concentrates and organizes the entire academic curriculum and instructional efforts around a clearly defined set of program outcomes all students should exemplify after completing the program. It is a student centered instruction model that focuses on measuring student performances through outcomes. A combination of skills, abilities, knowledge, attitudes and understanding that a student will attain as an effect of their successful engagement in a particular set of higher education experiences constitute these outcomes.

The Washington Accord in 2014 inducted India with the permanent signatory status of The National Board of Accreditation (NBA). The induction of India allows any Engineering graduate from NBA-accredited universities to be eligible for employment in any other country that has signed the accord. For an Indian Engineering Institution to get accredited by NBA according to the pacts of the 2014 accord, engineering institutions must follow the Outcome Based Education (OBE) model.

The OBE model measures the progress of graduates through Program Outcomes (PO), Program Educational Outcomes (PEO) and Course Outcomes (CO). Program Outcomes (POs) describe the qualities, skills, abilities and understandings that the students should develop as a consequence of engaging with the curriculum in the institution. Program Educational Outcomes (PEO) describe the career and professional accomplishments the program prepares the graduates to accomplish. Course Outcomes (CO) are the measurable parameters which evaluate students' performance in Bloom's Taxonomy levels (Remembering, understanding, Applying, Analyzing, Evaluating, and Creating) for each course that the student undertakes every semester.

For NBA accreditation, an institution has to satisfy 7 Criteria. The institution should submit documents for the evaluation and assessment of reaching each criterion. Generating these documents is a lengthy, tedious process that has to be manually done by the institution's staff, which is time-consuming. It is also required to collect and maintain all the necessary data for generating these documents.

To address these problems, we propose an automation system that manages all the procedures required for Criteria 3 attainment of the NBA accreditation process. This automated system uses an unstructured database to collect and store information from the faculty. Faculties can enter the required information through an easy-to-use web-based UI. After all necessary data is uploaded, the Institute's staff overlooking the process can generate the required reports using the system.

The system reduces the workload on faculty while hastening the accreditation process for Tier-2 Colleges. With the help of modular design, we can easily append additional features like other criteria or new automation features.

Accreditation for Six years will be awarded to a program based on the following requirements:

·   A minimum   score   of   750   points   in aggregate out of 1000 points with a minimum score of 60% has to be attained.

·   Number of available Ph.D. in the department should be greater than or equal to 30 per cent of the required number of faculty, averaged over two academic years

i.e. Current Academic Year (CAY) and Current Academic Year Minus One (CAYM1).

2   LITERATURE REVIEW

Mr Sunil P. Rajput in [1] proposes individual tools for automating report generation for Self Assessment Reports. Their proposed design for each criterion of NBA they are giving solutions takes all the required input for the respective standards and outputs the report. In their approach, after choosing criteria, it asks for all the data needed for it. Their system takes all these inputs and applies the required functions to perform all calculations. All the finalized outputs are used to generate and output the reports for NBA. This system's biggest drawback is the requirement to manually prepare and enter large quantities of data for each developed document. The above issue becomes even more tedious and time-consuming when the same data may be utilized for multiple purposes. We can improve these instead of storing all the data in a database, allowing us to use the data on call to prepare the reports and for other management functions.

This paper[2] gives an inside of the system used to replace excel sheets for CO-PO attainment calculation. It summarizes the basics of Outcome Based Education (OBE) and how PEOs, POs, and COs are related. It proposes a system where the Admin can Add students for the current year, whereas staff can perform operations such as inserting data in the form of a CO-PO matrix, target values, and direct and indirect assessment values. The system will then calculate CO attainment through direct and indirect assessment of teaching-learning values. The CO attainment calculations are provided as input for the PO attainment calculation. The system then generates an observation sheet, which shows whether the targeted PO attainment has been achieved or not.

This paper[3] gives a model for calculating the attainment of Program Educational Objectives (PEOs) and Program Outcomes (POs). It summarizes how to estimate the attainment of PEOs, POs and COs required for Outcome Based Education (OBE). It details the procedure for calculating the final attainment of the department's students using direct and indirect assessment. Direct assessment of the program outcomes includes various curricular components such as Examinations, Assignments and Projects. Indirect assessment includes various survey components like the Alumni survey, Employer survey, Curriculum feedback and Exit survey. It then shows four tables for we store and update the calculated values. It's proposed to use the averages of previous values approximately estimate future attainment. Using Internal and external assessments, Project Evaluation, Placement Records, Alumni Surveys, Exit Surveys, Curriculum surveys and Employer Feedback, the final PEO attainment is computed.

Paper Details	Year	Journal	Methodology	Highlights	Limitations
[1] Automatic Report Generation for NBA Criteria 1 to 5 -Mr. Sunil P. Rajput	2018	International Journal for Research in Engineering Application & Management	Their proposed design for each criterion of NBA they are giving solutions takes all the required input for the respective standards and outputs the report. In their system, after choosing criteria, it asks for all the data needed for it. Their system takes all these inputs and applies the Required functions to perform all calculations. All the finalized outputs are used to generate and output the reports for NBA.	· With appropriate details entered, PDF generation for Criteria 1 to 5. · Automate most of the calculations	· The requirement to manually prepare and enter large quantities of data for each developed document. · Its tedious and time-consuming when the same Data may be utilized for multiple purposes.

[2] Implementing an automated application for attainment Calculations of program outcomes In outcome based education -Hasib Masud Shaikh	2022	Journal of Positive School Psychology	It proposes a system where the Admin can Add students for the current year, whereas staff can perform operations such as inserting data in the form of a CO-PO matrix, target values, and direct and indirect assessment values. The system will then calculate CO attainment through assessment of teaching-learning values. The CO attainment is mapped to PO attainment. Indirect attainment is calculated with weight-age of course exit Survey analysis.	· Basics of Outcome Based Education and how Pos, Cos and PEOs are related. · Advantages and Objectives of OBE. Desktop application to automate final Attainment (Criteria 3).	· The User Interface is unclear, messy and not intuitive. Hence not user Friendly. · It requires all the necessary data to be inserted manually by a single person. · The final report Is not generated.
[3] Automating Outcome Based Education for the Attainment of Course and Program Outcomes -Akash Rajak	2018	Institute of Electrical and Electronics Engineers (IEEE)	Users exit survey, alumni survey, curriculum survey and employer feedback with a mapping table to estimate indirect attainment. Internal and External assessments of all subjects, project evaluations and placement records are used to calculate direct attainment. The final PO attainment is Calculated using 50% direct and 50% indirect assessment. The PEO attainment is calculated using the average of Mapped Pos.	· Proposes model for calculating the attainment of PEOs and Pos. · Final attainment is calculated with direct and indirect assessment. · Tables for calculating actual and expected attainment.	· This paper provides theoretical procedure for calculating attainment and not a practical implementation.

Table 1. Summary of related works

3   CONCLUSION

We proposed a system aggregating all the Research work done on automation of accreditation document preparation is limited. But as per the AICTE and UGC norms the colleges and branches of Institutes in which at least one batch has graduated should get accredited within stipulated time. The commercially available softwares for this accreditation process automation are few in numbers and not as per the requirement of users and are also not affordable by all Institutes. The literature review carried out here clearly indicates that it is necessary to design and implement a cost effect, flexible and easy to use software for automation of accreditation process.

procedures and data required for generating reports for Criteria 3 of pre-qualification of NBA accreditation into a single-page web application. A centralized system allows the isolation of individual responsibilities to reduce the need for manual data transfer and different storages for the same data, allowing the NBA in charge staff to generate all the documents in one go after all required data is made available.

The design should be more modular for adapting to the updates to the NBA process and adding newer modules and features. The above simplification of the process will allow more cost and time savings for the institution. The development of an accreditation automation system was necessary to save time and needed to generate the reports. Efforts should be made to simplify and modernize particular processes to make routine procedures quicker and efficient.

REFERENCES

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