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Quality Sustenance Measures for Higher Education Institutions

Sandhya Tiwari* and A Ravinder Nath**

This article explores the critical importance of quality sustenance measures for Higher Education Institutions (HEIs) in India, particularly in light of the transformative agenda set forth by the National Education Policy (NEP) 2020. As India aspires to become a global leader in higher education and a key provider of skilled manpower worldwide, maintaining and elevating academic standards has become an urgent priority. The authors discuss the evolving regulatory landscape, wherein bodies such as the University Grants Commission (UGC) mandate institutional accreditation and emphasise alignment with global standards like the United Nations Sustainable Development Goal 4. The article details how diverse institutional frameworks—including academic and administrative audits, mentoring, and the adoption of innovative best practices—are essential for benchmarking and sustaining quality across HEIs. It highlights the necessity for periodic review and monitoring of colleges by affiliating universities, pointing out that such processes not only prepare institutions for accreditation but also foster a culture of excellence. The piece underscores the significance of fulfilling multiple quality parameters, metrics, and criteria outlined by both national and international agencies, including AISHE, NAAC, NBA, and NIRF. Ultimately, the article presents quality assurance as a multidimensional, continuous process that involves all stakeholders. Its objectives include enhancing institutional performance, fostering a culture of best practices, and equipping faculty and staff to contribute effectively to institutional branding and progress. By adopting these measures, HEIs can ensure sustained improvement, global competitiveness, and alignment with national educational goals.

India is emerging as a global hub for higher educational activities and a feeder for skill-based man-power requirements of the world. With the launch of the new National Education Policy – 2020, Higher Education in India is expected to witness tremendous progress in academic standards and head for one of the top three areas of development. The University Grants Commission (UGC) has obligated all Higher Education Institutions (HEIs) to get accredited by 2024 as part of its quality mandate and also to meet the United Nations Sustainable Development Goal 4. Over the years country has established various institutional structures to evolve certain benchmarks for ensuring quality at different levels of Higher Education (HE). India enjoys a well-developed, large and diverse higher education system covering general, professional, technical and vocational, in addition newly proposed liberal education under

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NEP-2020. One of the major challenges in the 21st century is the offering of quality academic programmes to the next generation learners through inclusive expansion of higher education, having the relevance of Open Book Examination (OBE), flexibility through Choice Choice-Based Credit System/National Credit Framework (CBCS/NCrF) and mobility through Academic Bank of Credits (ABC) options.

Higher Education Institutions (HEIs) need to introduce innovative systems and best practices in their work environment that ensure rising standards and benchmarks for sustaining the quality and performance. Affiliating universities in the country have to periodically monitor and critically review the activities and performances of their constituent and affiliated colleges through mentoring and auditing measures. Indeed, the institutional audit and mentoring are envisaged, not only for the grant of affiliation, and to prepare the HEIs towards the quest for excellence.

The maintenance of the quality and standards, the HEIs need to fulfil the requirements of various parameters/aspects, criteria/key indicators and a set of metrics by international and national agencies for provision and access to information (AISHE), accreditation (NAAC/ NBA) and ranking (NIRF/ QS/ THE) for making various intervention measures. However, the accreditation of institutions/ programmes enables the substantial recognition of degrees and equivalence of qualifications for both horizontal and vertical mobility. Ranking aids in branding of the institution/program to make choices by students for seeking admission. The HEIs should make use of the advantages from such certification agencies/bodies and inculcate the soundest efforts in the day-to-day operations and processes, and also to emulate the responsive organisational structure, culture and work ethics in practice.

The affiliating university needs to formulate a policy to conduct an academic and administrative audit for every institution to ascertain the validity and reliability of information furnished by the HEIs. The mentoring and auditing will provide a qualitative assessment report on the benchmarked performance radars in terms of academics, research and governance and progress accomplished by the HEI based on the state of aspirations (vision and mission) and state of practices (SWOC Analysis) through a critical review of inputs, processes and outputs. Further, it will enable the institution to be self-reliant in filling the Data Capture Formats (DCF) of All India Survey on Higher Education (AISHE), Preparation of Self-Study Report (SSR) and Annual Quality Assurance Report (AQAR) for National Assessment and Accreditation Council (NAAC), Writing of Self-Assessment Report (SAR) and Mapping of Metrics for National Board of Accreditation (NBA) and Collection and Compiling of Data of Specific Parameters for uploading on National Institutional Ranking Framework (NIRF) portal will become easier. Ultimately helpful in formulating an Annual Report for the Higher Education Institution.

The quality sustenance measures mainly focus on evaluating the performance of the institution and identifying the issues that are to be addressed through intervention measures of institutional reforms to improve the quality of higher education in the country. The main objectives of the study are:

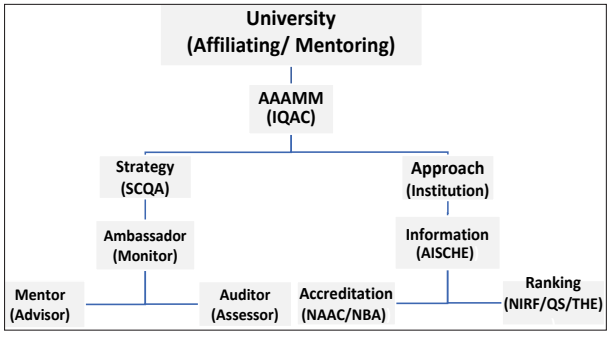
- To generate positive enthusiasm among stakeholders for institutional reforms and adopt best practices for a long-term progression with access, equity and excellence.
- To train the faculty and staff for proper processes, documentation, and presentation to enhance the profile and brand image of the institution in the context of globalisation.
- To suggest the intervention measures for improvement in institutional progress on the criteria, metrics and parameters specified by the accrediting and ranking agencies.
- To diagnose the bottlenecks in the existing administrative mechanisms and evaluate systemic changes needed for relevance (OBE), flexibility (CBCS) and mobility (ABC).
- To understand the structure and functions of the existing system and assess performance indicators of the HEI in terms of Academics, Research and Governance.
- To ascertain the efficient and effective working of Departments/centres and compare with well-established HEIs for optimum utilisation of financial and other resources.
- To identify the issues concerning administration, leadership and organisation in addition to functional autonomy and financial management.
- To recommend the methods of improvement for sustaining quality in higher education.

The University, which monitors the performance of its affiliating institutions, is intended to enforce the quality mandate pronounced by UGC and AICTE in a "Hub & Spoke" (H&S) Model through Academic and Administrative Auditing, Mentoring and Monitoring (AAAMM). This approach will facilitate external peer review for accomplishing overall development of the institution through optimal utilisation of accessible resources of expertise and facilities. The present study proposes a strategy (appraisers/peers - monitoring, mentoring and auditing) and approach (agencies/bodies – AISHE, NAAC/NBA and NIRF/QS/THE) for ensuring the quality in terms of academics, research and governance, while adhering to national and international mandates on the higher education system for implementation method (Figure-1). This will evaluate the responsibility and role of various appraisers/peers and bodies/agencies. The institutions interested in quality improvement should be ready to share the knowledge, information and resources, promote research collaborations, create infrastructural facilities, foster professional development activities and compete with the emerging needs of the society.

The Strategy

The proposed Academic and Administrative Auditing, Mentoring and Monitoring (AAAMM) is in tune with the UGC - Paramarsh Scheme and AICTE - Margadarshan Scheme for improving the quality of education through accreditation. However, the proposed model not only assists in institutional accreditation and aids in participation for ranking of institutions, while adhering to the quality mandate. An Expert Advisory Group (EAG) on Institutional Reforms suggest the constitution of a Standing Committee on Quality Assurance (SCQA) to prepare a policy framework for AAAMM, and the committee draw a pool of experts from academic institutions, research organisations and industrial establishments. The committee shall work under the appointed AAAMM Ambassador by the affiliating or mentoring university, who should be provided with the fixed honorarium and facilities on the lines of Chair/Emeritus Professor.

Figure 1: Academic-Administrative Audit Model



This will enable eliciting the support from senior academicians and creating a platform for auditing and mentoring of individual institutions by defining the clear-cut deliverables on quality mandate benchmarks. The eminent academician acts as an AAAM ambassador, and senior academicians play the role of mentor and auditor to improve the affiliated HEI quality. Mentors (*Margadarshaks)* are engaged to act as 'critical friends', guides and advisors to institutions for quality improvement. Their principal role is to support institutional progress and achieve institutional objectives, while adhering to institutional values and the action plan.

Auditors *(Nirdaraks)* who have experience in the implementation of institutional reforms and knowledge of academic quality systems with audit strategies and processes are nominated. They provide stakeholders with periodic evaluation reports of HEI performance against its objectives.

The ambassador, mentors and auditors are primarily senior academicians and preferably appointed out of a pool of retired faculty who excelled in their profession and contributed considerably to institutional reforms and its effective implementation with insight into the quality mandate. These experts (retired or serving) were nominated by the Vice Chancellor/ empanelled by the IQAC/SCQA of the Affiliating / Mentoring University and/or drawn from the VIDWAN Portal of INFLIBNET.

Role, Responsibility and Standards for Ambassadors, Mentors and Auditors

The Ambassador plays an important role in the policy framework for defining the protocols for AAAMM. He monitors the institutional activity report in terms of inputs, outputs, impact and outcome based on key performance indicators and also liaises closely with identified mentors and auditors. He has to organise an orientation on role, responsibility and standards for mentoring and auditing to assess the extent of progress accomplished in implementation of developmental activities and reforms with reference to perspective, strategic and action plans of the

institution against set out goals, targets, objectives, and values. The core data collected and compiled will provide a summary of the analysis of institutional performance with the help of the Management Information System (MIS), and it is capable of generating a report for policymakers and regulatory functionaries to make decisions. He ensures that the reports submitted by mentors and auditors are complete in all respects as stated in MIS and places them before the SCQA for recommendations and forwards it to the university for further action.

The principal role of the Mentor is to guide, support and encourage the institutions for the best use of their resources in development and quality sustenance activities. Mentors are advised to work effectively in partnership with institutions for better planning and management of time. They do not grade institutions, and reports are not made public as they are part of an ongoing dialogue of providing suggestions for optimally improving the status of institutions. Further, the Mentors are also encouraged to use the Mentor Network and Mentor Forums to discuss the issues, share good practices and benchmark institutional progress/concerns.

The main function of the auditor is expected to assess the performance radars by assigning a grade and also to establish what extent they have been successful in fulfilling their own institutional objectives. The auditors are primarily focused on evaluating the key parameters, suggested action, success indicators and targets for institutional performance. The grade descriptors ascribed by the auditors in the institutional grading profile are based on sound support of quantitative evidence and qualitative practice for each area of defined parameters. The responsibility of the mentor and auditor includes visiting each of their institutions at least twice in a year, alternatively with a three-month gap between the two and also to interact with the stakeholders (management, faculty, staff and students). They have to devote at least 16 working hours (i.e. two days or more as requested by the institution) to mentoring work during each of the two major visits to an institution to achieve the set targets against institutional vision, mission and objectives and to guide on accreditation and ranking process. The standards were set on based on principles of objective scrutiny of the state of aspirations (vision, mission and objectives) and state of practices of the institution (SWOC analysis).

To promote the quality in higher education institutions, a three-pronged strategy of auditing, mentoring and monitoring is suggested for achieving explicit and implicit objectives. The evaluation consists of three three-stage processes, which include the assessment of:

1. Suitability of Planned Activities with Stated Objectives of HEI through Mentoring
2. Conformity of the Actual Activities Executed at HEI as per the Plans through Auditing
3. Effectiveness of Activities in Achieving the Stated Objectives of HEI through Monitoring

The Approach

This approach mainly focuses on certain threshold standards for an institution to qualify for a certain status for affiliation and also getting prepared itself for accreditation and ranking. India is one of the largest Higher Education systems in the world, seeking to establish its name on the global map through quality and excellence. UNESCO mandated the member countries to formulate the policies for National Information Systems, National Quality Assurance Measures and National Qualification Frameworks. Accordingly, India has facilitated the establishment of AISHE for educational information, NAAC and NBA for quality assurance and CBCS for a qualification framework for the higher education system, in addition to NIRF for ranking.

The official information system on higher education plays a key role in various intervention measures and expansion of institutional capacity for greater access with equity and quality. All India Survey on Higher Education (AISHE) collect and compile the data through a dedicated portal and gathers institutional information in a Data Capture Format (DCF) consisting of Faculties/Schools, Departments/ Centers, Programs (Diploma/UG/ PG/PhD), Faculty-Staff-Student Strength and Diversity, Student Performance (Exam Results and Placements), Faculty - Staff Training and Progression, Financial Information (Receipts and Expenditure), Infrastructure (Physical, Academic, Skill Development, Information & Communication Technology (ICT) and Sports & Recreation) and Regulatory Approvals / Affiliations.

The institutional quality assurance is the sustenance of a minimum set of standards embodied for efficient, effective, systematic and structured operations with continuous maintenance and

improvement in both tangible and intangible assets. Accreditation is the measure of quality dimension that ensures that the HEIs meet the specified criteria of standards. There are two agencies (NAAC and NBA) in the country promoted by the UGC and AICTE to regulate the quality standards in HEIs, in addition to ISO certification by the Quality Council of India (QCI).

National Assessment and Accreditation Council (NAAC), ensures quality assurance as an integral part of the functioning of HEIs, which facilitates the Institutional Accreditation based on seven criteria (Curricular Aspects, Teaching, Learning & Evaluation, Research, Innovations & Extension, Infrastructure & Learning Resources, Student Support & Progression, Governance, Leadership & Management and Institutional Values & Best Practices) and 34 key indicators with variable weightage scores based on institutional structure and processes.

The National Board of Accreditation (NBA) assess the qualitative competence of the program offered by Higher Education Institutions (HEIs). The NBA has introduced new processes, parameters, metrics and criteria for accreditation that are in line with the best international practices and mainly oriented to assess the outcomes of the academic program. The criteria and metrics for evaluation include institutional vision, mission and objectives, organisation and governance, infrastructure provisions, quality of teaching and learning, curriculum design and review, central facilities, student progression measures and outreach activities.

Ranking of institutions has changed the landscape of higher education all over the world due to globalisation. It not only attracted wide attention both nationally and internationally, but also influenced the stakeholders in making choices, especially for students and faculty. It became more relevant in improving the educational quality in achieving excellence. National rankings were pioneered by the US News and World Report ranking in 1981. There are three known ranking systems in India: NIRF, QS India and THE India, which compare on a national basis.

National Institutional Ranking Framework (NIRF) enable the institutions to get classified into four different categories, such as overall, universities, institution (subject specific) and a new addition under research institution category with specific eligibility criteria with at least 500 research publications indexed in Web of Science/Scopus for a period of 3 years and at least 1000 students enrolled in PhD program among them at least 50% are recipient of fellowships. The other popular foreign ranking agencies consist of Quacquarelli Symonds (QS) rankings and Times Higher Education (THE) rankings, and both of them offer country-specific rankings based on multiple parameters/criteria. However, the weightages may vary for these parameters based on international, regional, group-specific and subject-specific rankings.

NIRF and THE India rankings compute the data supplied by the institution on a set of metrics and parameters with variable weightages under five broad heads each, whereas QS India rankings are based on six main parameters with variable weightages (Table 1). Then it suitably measures the performance score to place the institution at a specific position in the ranking band.

Better accreditation grade and ranking enabled the institutions to get graded autonomy to attract the funding, expand the collaborations and sustain the quality in higher education.

Table 1—Comparison of Weightage Criteria of NIRF, QS, and THE Ranking

No.	NIRF		QS India		THE India	
	Criteria	%	Criteria	%	Criteria	%
1.	Teaching, Learning & Resources	30	Academic Reputation	30	Teaching	30
2.	Research & Professional Practice	30	Employer Reputation	20	Research (Weightage for SDG Areas)	30
3.	Graduation Outcomes	20	Faculty Student Ratio	10	Citations	30
4.	Outreach & Inclusivity	10	International Faculty Ratio	2.5	International Outlook	7.5
5.	Perception	10	International Student Ratio	2.5	Industry Income	2.5
6.		-	Research Profile	35		-

Table 2--Basic Data on Higher Education Institutions

No.		Information				
1.	Institution Details	Name and Address, including Website				
		Contact No and E-mail ID				
		Year of Establishment and Institutional AISHE – ID				
2.	Society/ Trust Details	Name with Registration No. & Date				
		Memorandum of Association (MoA) & Articles of Association				
3.	Land Details	Acres (Resolution of the Society)				
4.	Affiliation	Temporary / Permanent / Any other specify				
5.	Institution Status	Minority/Non-Minority – Co-Education/Women				
6.	Approval Status	Government / Regulatory Body / University				
7.	Programs Offered by the Institution	No.	Program Name		Intake	No. of Sections
8.	Buildings	Approved Plans and Meets the Requirements				
9.	Faculty and Staff	Faculty Cadre Ratio		Faculty-Student Ratio		Faculty Staff Ratio
10.	Equipment	Computers		Central Facilities		Laboratories
11.	Finance	Receipts			Expenditure	
		Fee	Grants	Endowments	Recurring	Non-Recurring

The Implementation

The Academic and Administrative Auditing, Mentoring and Monitoring focuses on internal procedures adopted by a HEI in order to achieve its vision, mission and objectives. However, quality sustenance is one of the demand side interventions to meet the supply side initiatives, which includes academic and administrative reforms and also to facilitate the necessary intervention measures to initiate institutional reforms for ensuring the quality and equity.

The academic reforms include Outcome-Based Education (OBE), Choice-Based Credit System (CBCS) and Academic Bank of Credits (ABC). Whereas administrative reforms include the establishment of Institutional Structures, facilitating e-Governance with a Management Information System (MIS) through the National Knowledge Network (NKN) and the adoption of Public Finance Management System (PFMS) and the National Digital Payments Mission (NDPM). Adhering to the Environmental Management Framework (EMF) for continuous upgradation of infrastructure with asset sustainability and the Disclosure Management Framework (DMF) for academic accountability and administrative transparency of higher education institutions. Analysing the importance of institutional information, accreditation and ranking for sustaining the institutional academic quality and administrative excellence to achieve eminence. Nominating mentors and auditors to institutions for guiding and assessing the performance in specified parameters of academics, research and governance to improve the quality. Organising orientation for mentors and auditors, and workshops for institutional coordinators/ nodal officers on the implementation of quality sustenance measures at the institutional level.

Monitoring the reports of the mentor and auditor on institutional activities through a well-established Management Information System (MIS) to analyse the main features of the reports and also stakeholder feedback and inputs on key indicators using both qualitative and quantitative methods, in addition to validating the basic information provided by the affiliated. Format for collecting Basic Data on Higher Education is given in Table 2. Mentoring helps to focus on specific areas based on SWOC analysis to make appropriate interventional measures and better decision-making for ensuring institutional quality (Table 3). Areas to be covered under Mentoring and Auditing are mentioned in Tables 3 and 4, respectively. Format for the overall assessment of Higher Education is given in Table 5.

Most Important Criteria for Higher Education

Integrity: They have to always aim to be fair, objective and honest in their work, and fulfil their

Table 3: Areas to be Covered Under Mentoring

Institutional	Interventions	Initiatives	Action/Outcome
Progress in tune with Vision, Mission and objectives	Access	Gross Enrollment	Quantitative Improvement
	Equity	Diversity	Students, Faculty and Staff
	Quality	Infrastructure & Faculty	State-of-the-Art Facilities and Qualified & Trained
Reforms in tune with the national mandate	Academic	OBE, CBCS and ABC	Policy Framework & Qualitative Progress
	Administrative	Institutional Structures	Authorities and Bodies / Committees
Governance	Administration	e-Governance	Effectiveness
	Finance	Digital Transactions	Accountability
	Management	Performance	Efficiency
Innovations	Academics	Pedagogy	Teaching, Learning & Evaluation
	Research	Training	Projects, Publications and Collaborations
Student Support and Progression	Scholarships / Educational Loan	Sponsored	Endowment, Alumni, Industry, Institution, Government, NGO
		Loan	Institution and Bank
	Equal Opportunity Cell	SC/ST Cell, OBC Cell, EWS Cell, Minorities Cell, Women's Cell, Physically Challenged Cell	Coaching (Remedial, Entrance/ Eligibility Tests and Competitive Exams for Entry into Services) and Sensitisation Activities
	Placement & Training Cell	Entrepreneurship Development Cell, Guidance & Counselling Cell, English Language Training Cell, Computer Skill Training Cell, etc.	Developing a sound mind, strong character and successful personality; Improving computer and communication skills; Promoting leadership, team work and inter-personal skills
	Alumni Campus Connect Cell	Aid for Institutional Development	Human Capital, Knowledge Capital and Physical Capital
	Extra-curricular Activities Cell	Sports and Cultural Activities NSS/NCC Activities	Facilitate in grooming personal, analytical and social skills in addition to managerial skills
	Co-curricular Activities Cell	Seminars/Symposia/ Workshops and Debates / Group Projects	Explore individual hidden talent and Enable to develop individual mind, traits and organizing skills

tasks by basing their judgements on expert evaluation using sound evidence.

Independence: They enjoy the freedom to express the views that carry dignity and respect to serve the institutional and stakeholder interests in promoting and ensuring the quality.

Professionalism: They have to set high professional standards in everything they do in improving the institutional performance. They have to provide relevant and effective support and evaluation that can be trusted by all stakeholders.

Accountability*:* They must believe that accountability starts with individuals taking proper responsibility for their own actions. They will report as they find. They will also seek to improve and evaluate their own work as much as they encourage others to do the same.

Openness*:* They will be open and approachable about the work they do, and how they do it, believing that this encourages trust and confidence. They are committed to communicating clearly and accessibly about all aspects of their work.

Departmental Profile

The University, through a well-structured format, collects the necessary primary data and information from all the Departments of Studies and other Sections of the University on Programs Offered, Students Enrolment, Faculty Strength, Infrastructure and other Programmes conducted during the last five years. The system of evaluation and internal assessment, and the results of students, placement and further progression of students in higher education are assessed using these details. This forms the basis for the visit of the AAAC in phase 1 of the analysis.

Table 4: Areas to be Covered under Audit

Criteria / Parameter	Action	Success Indicator		Target	Score (5/4/3/2/1)
Academics (50%)	**Programs**	**Relevance (OBE)**		Adopted - Outcome-Based Education	
		Flexibility (CBCS)		Followed - Choice-Based Credit System	
		Mobility (ABC)		Recognised - Academic Bank of Credits	
	Pedagogy	**Teaching**		Facilitated Innovative Tools and Techniques	
		Learning		Access to Multiple Learning Modes	
		Evaluation		Continuous Comprehensive Evaluation	
	Faculty	**Qualified**		% Faculty with Highest Academic Degree	
		Trained		% of Faculty Trained in Subject and Pedagogy	
		Experience (PDF/Ind.)		% of Faculty with PDF & Industry Experience	
	Students	**Diversity**	**Gender**	Should Meet National Average	
			Equity	Fulfil the Reservation Norms	
			Other State	At least 5% of Students	
			International	5 - 15% of Students	
		Academic Performance		70% of Students qualify above B+ Grade	
		Academic Outcome		At least 40% in Jobs and 20% in HE	
	Feedback	**Satisfaction Survey**	**Students**	Curricular Aspects, Pedagogy and Support	
			Faculty	Institutional Environment and Career Progress	
			Management	Institutional Reforms and Progress	
Research (30%)	**Projects**	**Individual**		At least 20% of the Faculty at any given time	
		Departmental		At least 50% of the departments at any given time	
		Institutional		At least one at any given time	
		Networked		At least two at any given time	
	Publications	**Number/Faculty/Year**		One	
		Impact Factor		More than 1.0	
		Citations/Year/Paper		2 Citations	
	Collaborations	**Inter Departmental**		At least 50% Departments	
		Inter Institutional		At least 25% Departments	
Governance (20%)	**Organization**	**Statutory Authorities**		Create such Posts for the Implementation of Policy	
		Statutory Bodies		Create such Bodies for Policy Framework	
	Infrastructure	**Physical**		Academic, Administrative & Amenities	
		Academic		Library Books and Journals – Print & Digital	
		Skill		Workshops, Central Instrumentation Facility etc.	
		ICT		LAN and Wi-Fi Network @ 1:6 Computers	
		Sports & Recreation		Playgrounds, Indoor Stadium & Auditorium	
	Finance	**Receipts - Heads**		Fee, Grants, Philanthropy and Others	
		Expenditure – Heads		Recurring and Non-Recurring	
		Corpus Fund – Heads		IDF, RDF, SSF, FSDF, MERF	
	Outreach	**Community EP / Dept**		Continuing Education Program / At least 2	
		Student Empowerment		EOC, PTC (GCC & EDC), ACC, CCA & ECA	
Target Criteria Value: Excellent – 100% (5), Very Good – 90% (4), Good – 80% (3), Fair – 70% (2), Poor – 60% (1)					

Table 5: Overall Assessment for Rating of Higher Education Institution

Criteria / Parameter	Action	Success Indicator		Target / Criteria Value					Score (5/4/3/2/1)
				Excellent	V. Good	Good	Fair	Poor	
				100%	90%	80%	70%	60%	
Academics (50%)	Programs	Relevance (OBE)							
		Flexibility (CBCS)							
		Mobility (ABC)							
	Pedagogy	Teaching							
		Learning							
		Evaluation							
	Faculty	Qualified							
		Trained							
		Experience (PDF/Ind.)							
	Students	Diversity	Gender						
			Equity						
			Other State						
			International						
		Academic Performance							
		Academic Outcome							
Research (30%)	Projects	Individual							
		Departmental							
		Institutional							
		Networked							
	Publications	Number/Faculty							
		Impact Factor							
		Citations							
	Collaborations	Inter Departmental							
		Inter Institutional							
Governance (20%)	Organization	Statutory Authorities							
		Statutory Bodies							
	Infrastructure	Physical							
		Academic							
		Skill							
		ICT							
		Sports & Recreation							
	Finance	Receipts - Heads							
		Expenditure – Heads							
		Corpus Fund – Heads							
	Outreach	Community Empowerment							
		Student Empowerment							

Profile of Teachers

A Self-Appraisal Form is prepared and distributed to all faculty members in order to collect the information from each Teacher regarding their Qualification, Experience, Research Publications during the last five years, number of Research Projects, and Funds Mobilized by the Teacher, Conferences Attended and Papers Presented, Foreign Academic Visits, Fellowships Obtained, Countries Visited, Organizations of Conferences, Membership of Academic Societies, etc. This forms another major input to evaluate the performances of Teachers and their capability matrix under the context of their Teaching, Learning, Research and Development, and Extension Activities.

Feedback from Students

Students' feedback is an essential component of any assessment. It provides an opportunity to elicit the views of the students regarding the general facilities available in the Department, their opinion about the teaching and research commitment and capability of the Faculty, the role of administrators and system of administration, delays and denials of justice, and for providing better amenities and care on campus with modern tools and techniques. Questions regarding teacher's regularity in conducting classes, providing up-to-date information on the subject, their orientation to the assigned part of the curriculum, style and efficiency of teaching, clarity in imparting information, availability of the teacher before and after the class hours for consultation, general ability of the teachers, their capabilities in motivating students for progression, etc are normally included in such exercises. Students are also asked to give their feedback in an abstract manner. This is a good initiative for introspection from its stakeholders and beneficiaries. The AAAC evaluate these forms and suggests improvement possibilities.

Questionnaire for Administration

A questionnaire is also prepared for obtaining the role played by various administrative sections including the offices of Registrar, Registrar (Evaluation), Finance Officer and the other supporting units such as SC/ST Cell, University Library, Student Welfare Office, University Health Centre, Garden Department, National Service Scheme, Directorate of Correspondence Courses (DCC) and Estate Office while delivering services to students, staff and the other stakeholders and also to elicit the information regarding the efficiency of the functioning of these Offices. This will also help in carrying out reforms. 4

Spot Visit by AAAC

The Academic and Administrative Audit Centres AAAC, with the help of the IQAC initiates the process of Academic and Administrative Audit by visiting all the Departments, Units and Facilities for the purpose of understanding the Departments, Faculty and their activities. This exercise is carried out in all Departments/Units to offer valuable suggestions to improve their performances both individually and collectively. Sufficient time is also provided for the Departments and the Faculty to prepare themselves for this exercise. In each Department, the Faculty are allowed to present their Departmental Profile. The details of their programs, accomplishments, achievements of the Faculty and the prospective plans for the next five years as per the criterion-wise indicators given by the NAAC in this booklet. During this visit, the Students shall be asked to comment on the ongoing teaching methods and programs offered by the Departments. They are also asked to not only to give their opinion about the relevance of the existing Programs but also to give their feedback about the quality of Teaching, Learning, evaluation and placements. The Students are given freedom to express their views frankly and freely to the members of AAAC. In addition, the AAAC shall also meet the teaching faculty, non-teaching and technical staff to obtain their feedback and suggestions for improvement.

Visit to Physical Infrastructure

The AAAC shall visit all the laboratories, museums, student amenities, halls of residence, and facilities made available to its stakeholders. Abstract Information of the Department/centre: During the time of visit, in addition to showing all publications and research findings, the Head of the Department or centre is expected to provide the following data, in this proforma.

Conclusions

The implementation of comprehensive academic and administrative audits is instrumental in driving institutional transformation. By fostering academic reforms, encouraging research and innovation, and enhancing governance structures, such audits pave the way for substantial improvements across multiple domains. This process contributes to the empowerment of students—elevating employability and learning outcomes—while simultaneously advancing faculty development through enriched research output and successful project execution. Furthermore, these measures strengthen institutional management by increasing stakeholder satisfaction and expanding revenue streams. Academic excellence, as evidenced by rising Gross Enrolment Ratios and the ability to attract talented students, opens new avenues for collaboration and enables the introduction of diverse academic programs. Accredited institutions not only boost their appeal to both domestic and international students but also become eligible for grants and enhanced leadership opportunities. Ultimately, these audits provide

a strategic framework for institutions to achieve their objectives, align with key performance indicators, and consistently meet the standards set by accrediting and ranking agencies, thus ensuring sustained growth and quality in higher education.

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Announcement

Special Issue of 'University News'

A Special Issue of 'University News' on the theme **'Integrating Traditional Wisdom in Curriculum and Research'** is being brought out on 8 December, 2025 on the occasion of the **AIU North Zone Vice Chancellors' Meet** scheduled to be held on **December 09-10, 2025** at **Lovely Professional University Jalandhar, Punjab**. The Articles are invited on the following Subthemes:

- Embedding Indian Knowledge Systems (IKS) into University Curricula.
- Interdisciplinary Research Linking Ancient Wisdom with Modern Science & Technology.
- Faculty Development on Traditional Knowledge Pedagogies.

Any Other Relevant Subthemes

The Special Issue will cover the articles of eminent educationists on the afore-mentioned theme. Readers of the University News are also invited to contribute to the Special Issue by submitting papers/articles on the above theme/subthemes by **November 14, 2025**. The papers will be published in the Issue subject to the approval of the Editorial Committee of the University News.

Guidelines for contributors are placed on the AIU Website. Manuscripts may be sent to Dr Sistla Rama Devi Pani Editor, University News, Association of Indian Universities, AIU House, 16 Comrade Indrajit Gupta Marg (Kotla Marg), New Delhi-110 002 through E-mail: ramapani.universitynews@gmail.com with a copy to: universitynews@aiu.ac.in on or before November 14, 2025.

From Classrooms to Colliders: How Universities Can Power India's Mega-science Revolution

Yogesh Chandra Sharma*, Victor Gambhir and Suresh Doravari*****

The Mega Science Vision–2035 (MSV-2035), advanced by the Office of the Principal Scientific Adviser to the Government of India, sets a national roadmap for India's prioritised engagement in large-scale scientific endeavours across six domains: High-Energy Physics, Nuclear Physics, Astronomy & Astrophysics, Accelerator Science and Technology and Applications, Climate Research, and Ecology & Environmental Science. This article argues that Higher Educational Institutions (HEIs) are central to achieving MSV-2035 and presents a practical, phased roadmap for HEI alignment. In the short term, HEIs must modernise curricula, integrate hands-on research, and upgrade shared laboratory and computing infrastructure. In the medium term, emphasis should shift to consortium building, joint degree and internship programs with national labs and international partners, and stronger industry linkages. In the long term, HEIs should institutionalise sustained funding models, outcome-driven evaluation, and global talent attraction to position India as a leader in mega-science. LIGO-India, TMT, SKA and INO illustrate concrete entry points — hardware, software, data science, and workforce development — where HEIs can deliver measurable impact. A brief discussion of AICTE's model curricula for minor degrees and M. Tech specialisations in Quantum Technologies is included, and its relevance to MSV implementation is analysed. It also offers actionable recommendations for policymakers, university leaders, and funders to ensure that India's campuses transform classrooms into gateways and corridors into catalysts for national innovation. The article has been reviewed by some experts, and their comments are presented in Appendix 1.

Presently, India stands at the cusp of a scientific inflexion point. Recently announced MSV-2035 provides a coherent blueprint to channelise national intellectual and industrial energy into a few high-impact domains. These range from particle and nuclear physics to astrophysics, accelerators, climate research and environmental science. These domains are both expanding fundamental knowledge and spawning technologies that fuel healthcare, computing, materials and industry. But history suggests that the success of MSV-2035 will depend on a partner, which in India, too often taken for granted, and that is educational institutions (1). They sustain institutional memory across multi-decadal projects and connect national ambitions to local communities and schools. Hence, it is important to understand that if MSV-2035 is the map, the journey will be possible if HEIs are ready as infrastructure to help it. In the classrooms and laboratories of the Universities and colleges, instrumentation is researched and tested through interdisciplinary collaboration and then converted into products through the entrepreneurs being trained there. But for sure, they cannot be treated like talent factories. So, to convert MSV-2035 from policy to leadership, Indian HEIs must adopt a strategic, phased approach. They should modernise curricula to meet mega-science skill needs. They have to build shared laboratories and computer centres. They have to formalise consortia and joint degrees with national and international partners. They need to strengthen industry linkages and technology-transfer processes. It is also needed to provide sustained stress engagement with school education. For that, continuous teacher training and development of hands-on modules are very much needed. This will broaden and diversify the talent pipeline.

Presently, there are some concrete entry points available. Scientific endeavours like LIGO-India, TMT, SKA, INO are those entry points where universities can contribute hardware, software, data science and human capital (2-5). These Mega Science Projects (MSPs) are large-scale national facilities, having international collaborations to tackle fundamental scientific questions. These are multi-crore projects which need specialised instrumentation; these demand distributed expertise and durable institutional support. MSV-2035 identifies six priority domains where India should concentrate its efforts.

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Detailed reports for the High Energy Physics, Nuclear Physics, Astronomy & Astrophysics and Accelerator Science & Technology and Applications are available (6-9). The 2035 horizon aligns with global timelines for building and exploiting new facilities, offering India a strategic basis for investments, partnerships and capacity building. MSV-2035 emphasises four cross-cutting capabilities: human capital development, advanced instrumentation, high-performance computing and data science, and industry-grade manufacturing. HEIs can contribute substantially to each, making them indispensable partners in national mega-science ambitions.

MSV Domain Overviews and National Relevance

A brief overview of the MSV domains and their relevance in the Indian context is Discussed here.

High Energy Physics

High Energy Physics (HEP) – essentially particle physics – is the study of elementary particles (such as quarks, leptons, bosons) and the forces that govern their interactions. This fundamental field seeks to uncover the basic building blocks of matter and the laws of nature, testing theories like the Standard Model and probing beyond it (for example, via neutrino properties or searches for new forces). Globally, HEP has yielded landmark discoveries (e.g. the Higgs boson, neutrino oscillations) and underpins our understanding of the early universe. It also drives technological advances: building large particle detectors and colliders has led to innovations in superconducting magnets, cryogenics, fast electronics, and distributed computing (e.g. the Worldwide LHC Computing Grid) (10-11).

In India's context, HEP has been pursued at research institutes and universities (e.g. TIFR, RRCAT, IITs, IISc), often in collaboration with international projects. Indian scientists contribute to experiments at CERN's Large Hadron Collider (LHC) and other facilities, and also plan domestic initiatives such as underground neutrino observatories and cosmic-ray detectors. By engaging in HEP, India builds a highly skilled workforce of physicists and engineers and acquires advanced instrumentation expertise. Ultimately, HEP is significant not only for the fundamental knowledge it yields but also for fostering cutting-edge technology and high-performance computing capabilities that have broad applications.

Nuclear Physics

Nuclear Physics focuses on the constituents of atomic nuclei (protons and neutrons) and the forces binding them. It seeks to understand nuclear structure and reactions – processes at scales of femtometers (10^{-15} m). Traditionally associated with nuclear energy, nuclear physics encompasses both low-energy nuclear structure studies and high-energy heavy-ion collisions. Beyond power generation, nuclear physics has yielded many practical applications: for example, the same knowledge produces medical isotopes for imaging and cancer therapy (PET scans, radiation therapy), magnetic resonance imaging (MRI) technologies, ion-beam materials processing, and radiocarbon dating in archaeology and geology. It also overlaps with particle physics (e.g. the study of fundamental symmetries using nuclei) and astrophysics (understanding nucleosynthesis in stars and supernovae).

For India, nuclear physics is crucial for energy and technology goals. India's expanding nuclear energy program (heavy-water reactors, fast breeder reactors) and proposed fusion efforts draw directly on nuclear research. National laboratories such as BARC, VECC, RRCAT and IUAC operate accelerators and reactors for basic research and applied work. Nuclear physics also supports national security (radiation detectors) and health (radioisotope production). In the global context, India is part of collaborative projects in nuclear physics (e.g. experiments at CERN's ALICE detector for quark–gluon plasma, or neutrino observatories). By emphasising nuclear physics in MSV-2035, India aims to leverage its scientific strengths to support clean energy, medical technology, and its understanding of nuclear matter while building indigenous capabilities in high-intensity accelerators and detectors (12).

Astronomy and Astrophysics

Astronomy and Astrophysics is the science of the universe beyond Earth. It spans the study of objects from planets and stars to galaxies and the cosmos, as well as fundamental physics like gravity and high-energy processes. Astronomy is inherently multi-disciplinary – it connects physics, chemistry, biology and engineering – and is driven by observations across the electromagnetic spectrum (radio, optical, X-ray, etc.) as well as other "messengers" (neutrinos, gravitational waves). This

field addresses fundamental questions: How did the Universe begin and evolve? What is the nature of dark matter and dark energy? How do stars and galaxies form? It has achieved breakthroughs (e.g. detection of exoplanets, precision cosmology from the cosmic microwave background, multi-messenger observations of neutron-star mergers) that have broad implications for physics, space science, and even philosophy. Advances in astronomical instrumentation (telescopes, satellites, detectors) have driven spin-offs in optics, imaging technology, and signal processing.

Indian astronomy has a rich tradition: research ranges from solar physics to cosmology. Indians have made significant theoretical contributions in black hole physics, gravitational waves and cosmology. National observatories (optical, radio, space-based) and instruments (e.g. GMRT, ASTROSAT) are in operation, and Indian astronomers collaborate on international projects. Astronomy is globally significant to India as well: for example, the Square Kilometre Array (radio telescope) and LIGO gravitational-wave network welcome Indian participation. Astronomy education also inspires students and supports industries (e.g. advanced optics and sensor fabrication). In MSV-2035, astronomy and astrophysics serve both as scientific discovery pursuits and as a way to position India in global space science efforts, while training a talented technical workforce.

Accelerator Science & Technology and Applications (ASTA)

Accelerator Science & Technology and Applications (ASTA) covers the design and use of particle accelerators for both fundamental research and practical applications. Particle accelerators are machines that speed up charged particles (electrons, protons, ions) to high energies using electromagnetic fields. Since their inception in the 20th century, accelerators have enabled discoveries in nuclear and particle physics, but they have become ubiquitous tools in many domains. While the largest accelerators (e.g. LHC) are built for fundamental physics, most accelerators today are for applied uses: materials science (synchrotron X-ray sources, free-electron lasers), medical therapy (electron and proton cancer therapy machines), medical isotope production, industrial processing (radiation sterilisation, polymer modification), security scanning, and even national security and space research. For example, compact cyclotrons produce radioisotopes for hospitals, and synchrotron sources probe materials at atomic scales for nanotechnology. Accelerators also enable innovative energy concepts, such as accelerator-driven subcritical reactors for nuclear waste transmutation.

India has made rapid progress in accelerator technology. Indigenous accelerators now exist for various applications (from ion implanters to medical LINACs), and Indian scientists contribute to global projects (e.g. development of components for CERN accelerators). Continued ASTA research under MSV-2035 will drive development of advanced engineering – high-field magnets, RF systems, vacuum technology, and precision instrumentation – and create new opportunities for industry (manufacturing accelerator components) and healthcare (new cancer treatments). It also feeds back into physics: for instance, building a new accelerator facility might address both basic nuclear-reaction studies and practical isotope production (14).

Climate Research

Climate Research studies Earth's climate system (atmosphere, hydrosphere, cryosphere, biosphere) and how it is changing. Its scope includes understanding natural climate variability, human-driven climate change, and predicting future impacts. Climate science is of critical national and global importance. The Intergovernmental Panel on Climate Change (IPCC) reports that recent climate change is "widespread, rapid, intensifying and unprecedented" in human history. Extreme events – heat waves, storms, floods and droughts – have grown more frequent and severe, with disastrous impacts on societies and ecosystems. Cutting-edge climate research combines observations (weather stations, satellites, ocean buoys) with high-resolution models of the atmosphere and oceans. It informs mitigation (e.g. reducing greenhouse gases) and adaptation (infrastructure planning, disaster risk reduction).

For India, climate research is urgent: the South Asian monsoon and Himalayan glaciers profoundly affect water and agriculture for a billion people. Recent extreme events in northern India have underscored this urgency and demonstrated the need for improved prediction and adaptation capabilities. Programs like monsoon missions and advanced Earth-system models aim to improve forecasts of rainfall, cyclones, and glacial melt. India has also been active in international climate assessment and has established national missions on climate change.

By including Climate Research in MSV-2035, India commits to strengthening its modelling, observation and attribution science. Outcomes include better early warning systems and resilient development strategies, which in turn safeguard agriculture, health and economic growth against climate risks.

Ecology and Environmental Science

Ecology and Environmental Science examine the relationships among living organisms and their physical environment. This includes the study of biodiversity, ecosystem services (such as clean water, pollination, and carbon sequestration), and environmental processes. Globally, the health of ecosystems is recognised as critical to human well-being. Alarmingly, a recent UN-backed assessment warns that "up to one million plant and animal species face extinction, many within decades, because of human activities". Losses of biodiversity and ecosystem degradation undermine food security, increase vulnerability to disasters, and can exacerbate climate change. Environmental science also covers pollution (air, water, soil), resource management, and the impacts of land-use change.

In India, rich ecological regions (Himalayas, Western Ghats, Sundarbans, etc.) harbour exceptional biodiversity, but face pressures from population growth and development. Research in ecology informs conservation of endangered species, restoration of forests and wetlands, and sustainable use of natural resources. It ties closely to climate science (for example, forests sequester carbon). By prioritising Ecology and Environmental Science in MSV-2035, India aims to integrate research on ecosystems into national planning for agriculture, urbanisation and disaster management. This scientific foundation supports policies for clean air and water, and helps fulfil international commitments like the Sustainable Development Goals and biodiversity targets (14-16).

Educational Institutions and Mega Science Vision–2035

The successful implementation of the Mega Science Vision–2035 (MSV-2035) requires not only strategic planning at the national level but also deep institutional participation across the education ecosystem. India's universities, research institutes, and schools form the foundational structure of its scientific and technological capacity, in line with NEP–2020 (17). Without their active alignment, the ambitious goals outlined in MSV-2035 cannot be met sustainably.

Why Education Matters for Mega-Science

Mega-science projects are long-term, complex, and multidisciplinary. They demand a steady stream of skilled researchers, technologists, engineers, and science communicators. These cannot be produced solely by research labs; rather, the training must begin in classrooms, where curiosity is nurtured and critical thinking is developed. Universities provide the advanced education, training, and research exposure needed to produce domain experts. Schools, on the other hand, are crucial for early-stage inspiration and awareness—planting the seed of interest in fundamental science and technology.

Furthermore, many of the spin-off benefits of mega-science projects—new materials, computing technologies, medical imaging tools, or environmental monitoring systems—become truly transformative only when they are diffused into the wider educational landscape. Universities and schools are not peripheral to mega-science; they are its enablers, multipliers, and custodians.

MSV-2035 is not merely a catalogue of scientific fields; it lays out *strategic national goals* by aligning science priorities with India's development objectives. The vision emphasises building human and technical capacity, fostering innovation, and leveraging big science for societal benefit. Key goals and benefits include:

A. ***Human Resource and Capacity Building*:** Developing and retaining skilled scientists, engineers and technicians is central. MSV-2035 will catalyse training programs, graduate education and institutional upgrades. This creates a larger cadre of experts able to execute complex projects, run state-of-the-art facilities, and mentor the next generation. In turn, it strengthens India's scientific ecosystem and reduces dependence on foreign expertise. [1]

B. ***Innovation and Technological Leadership*:** Mega-science projects often spur new technologies. For example, particle detectors and superconducting magnets developed for research enabled advanced medical imaging or energy applications. MSV-2035's focus on accelerators, detectors, high-performance computing and observing systems drives innovation in industry. By setting ambitious R&D targets (e.g. building a high-brightness synchrotron, next-

generation observatories, or advanced climate supercomputing), India can emerge as a leader in fields like accelerator manufacturing, space instrumentation, and climate modelling software. Indigenous development of such technology also stimulates startups and high-tech manufacturing sectors.

C. ***Global Scientific Leadership and Collaboration*****:** A clear roadmap helps India negotiate and contribute to international mega-projects as an equal partner. Participation in flagship projects (e.g. telescopes, particle colliders, climate initiatives) raises India's profile and gives Indian researchers access to frontier data and co-authorship in high-impact science. By setting strategic priorities in MSV-2035, India can coordinate its efforts – ensuring, for instance, that contributions to CERN or SKA align with national strengths. This leadership role also enhances soft power, as India becomes known for its expertise in critical science domains.

D. ***Economic and Industrial Development*****:** Mega-science infrastructure has direct spillovers to industry. Building large facilities (accelerators, telescopes, climate observation satellites) requires complex components (RF systems, precision mechanics, optical systems, clean energy technologies) that can be sourced from or developed by Indian companies. For example, work on accelerator magnets and cryogenics supports domestic manufacturing of advanced materials. Climate and environmental science can guide industries toward greener practices and disaster-resilient infrastructure. Overall, MSV-2035 is expected to create high-value jobs in manufacturing, IT (for data analysis), and services, thereby contributing to economic growth.

E. ***Addressing National Challenges*****:** Finally, the mega-science agenda is tied to national priorities. Climate research and ecology directly inform strategies for climate resilience, disaster preparedness and sustainable development. Nuclear and accelerator research support clean energy goals (through nuclear power and potentially accelerator-driven systems) and healthcare (through medical diagnostics). Astronomy and HEP inspire education in STEM and open new technological vistas (e.g. space technologies with terrestrial applications). By integrating long-term scientific vision with policy needs, MSV-2035 ensures that fundamental research also serves India's societal and economic needs.

So, *Mega Science Vision–2035* provides a coherent, forward-looking roadmap that connects India's scientific ambitions with its broader national agenda. It encourages the development of advanced research infrastructure and talent, drives innovation, strengthens international partnerships, and ultimately yields economic and social benefits. By pursuing MSV-2035, India positions itself to contribute decisively to fundamental science while harnessing that endeavour for national progress and global leadership.

The Role of HEIs in Advancing MSV-2035

Higher education institutions must play five interlocking roles. These are:

Integrating Mega-Science into Curricula

To align with MSV-2035, HEIs must reorient their undergraduate and postgraduate curricula to reflect the evolving frontiers of science:

- *Core Concepts in Mega-Science Domains*: Offer electives and core modules in particle physics, astrophysics, accelerator technology, climate modelling, and environmental systems.
- *Interdisciplinary Learning*: Develop flexible programs combining physics with engineering, data science, AI, and environmental science.
- *Research-Linked Teaching*: Integrate real-world case studies from LIGO–India, SKA, or INO into classroom teaching to bridge theory and practice.

Research Capacity and Infrastructure Development

MSV-2035's success depends on expanding India's base of research-active institutions. HEIs can contribute in several ways (Table 1):

- *Research Labs and Shared Facilities*: Leverage programs like FIST, PURSE, and SATHI to build shared instrumentation facilities aligned with mega-science needs.
- *University-Laboratory Linkages:* Facilitate collaborative projects with national labs (e.g., IUCAA, RRCAT, TIFR), enabling faculty and student access to advanced infrastructure.
- *Consortia Participation*: Join research consortia aligned with mega-projects (e.g., Indian TMT consortium, SKA partner network), contributing niche expertise or manpower.

Human Resource Development

- *Doctoral and Postdoctoral Training*: Establish funded PhD and postdoc programs focused on MSV-2035 domains, in partnership with research labs and industry.
- *Faculty Development*: Organise workshops, sabbaticals, and training sessions for faculty to update their skills in emerging areas such as quantum instrumentation, cryogenics, or high-performance computing (HPC).
- *Visiting Scientist Programmes*: Invite national and international scientists involved in mega-science projects to deliver lectures, guide research, and mentor students.

Technology Development and Innovation Ecosystem

- *Innovation Hubs:* Establish dedicated centres to translate mega-science research into spin-off technologies with societal applications.
- *Startups and Incubation*: Facilitate academic startups in high-tech domains (e.g., photonics, RF engineering, precision optics) that support mega-projects.
- *IP and Commercialisation*: Strengthen university -level technology transfer offices (TTOs) to patent and license innovations derived from mega-science collaborations.

Outreach and Public Engagement

- *Science Communication*: Build capacity for outreach by offering science communication courses and organising public talks on topics like dark matter, gravitational waves, or climate science.
- *Participation in National Exhibitions*: Collaborate with exhibitions like *Vigyan Samagam* or the India International Science Festival to showcase academic contributions to mega-science.
- *Citizen Science*: Launch community projects (e.g., amateur telescope building, biodiversity documentation, weather monitoring) to democratize science.

Roadmap for HEI Alignment with MSV-2035

Phase 1: Institutional Groundwork (0–3 years)

- Curriculum revision to introduce foundational and emerging topics.
- Establish academic chairs and focused research centres in each MSV domain.
- Faculty recruitment and training in cutting-edge fields.
- Set up shared R&D facilities under DST-supported schemes.
- Build a database of ongoing mega-science-aligned research in universities

Phase 2: Collaborative Expansion (3-6 years)

- Launch joint degree programs (e.g., M.Tech in Accelerator Physics, Ph.D. in Climate Science).
- Formalise research consortia with labs and other HEIs.
- Establish university-based satellite nodes of mega-projects.
- Create HEI-industry mega-science innovation forums.
- Develop integrated data platforms for joint use in education and research.

Phase 3: Global Leadership and Sustainability (6-8 years)

- Attract international faculty, students, and postdocs to MSV-aligned programs.
- Institutionalise outcome-based research assessment models.
- Establish flagship university-led observatories, labs, or AI centres for mega-science.
- Create permanent public outreach centres for science communication.
- Secure long-term funding from public and private sources.

Schools: Seeding the Future

Mega-science in the School Curriculum

In line with the National Education Policy (NEP) 2020, school education should inspire scientific inquiry and problem-solving (17). MSV-2035 provides rich content for such transformation:

- *Curriculum Integration*: Include examples from mega-science (e.g., black holes, neutrinos, fusion energy) in physics, environmental science, and technology textbooks.
- *STEM Projects*: Encourage project-based learning—students can build simple interferometers, optical benches, simulate star clusters, or analyse local climate data.
- *Interdisciplinary Learning:* Organise themed weeks (e.g., "Space Week" or "Climate Science Week") to explore interconnected topics.

Table 1: Mapping of MSV Domains to HEI Contributions, National Laboratories, and Sample Courses

MSV domain	HEI contributions	Relevant national labs/ collaborators (some examples)	Sample/Recommended HEI courses & modules
High-Energy Physics (HEP)	Detector R&D, data analysis, theory groups, computing clusters, graduate training	TIFR, IUAC, RRCAT, CERN-India liaison	MSc/PhD Particle Physics; Detector Instrumentation Lab; Grid & Distributed Computing; Statistical Methods in HEP
Nuclear Physics	Accelerator experiments, isotope production research, radiation detectors, materials for radiation environments	BARC, VECC, RRCAT, IUAC	M.Tech/PhD Nuclear Physics; Radiation Detectors & Instrumentation; Nuclear Materials; Radioisotope Applications
Astronomy & Astrophysics	Telescope/instrumentation development, survey pipelines, citizen science, outreach	NCRA (GMRT), ISRO (ASTROSAT), IUCAA, SKA-India	BSc/MSc Astrophysics; Observational Techniques; Radio Astronomy Lab; Data-intensive Astronomy
Accelerator Science & Technology (ASTA)	Accelerator design labs, RF systems, cryogenics, and medical accelerator applications	RRCAT, IUAC, industry partners	M.Tech Accelerator Physics; RF & Microwave Engineering; Cryogenics & Vacuum Technology
Climate Research	Regional modelling, downscaling, observational networks, impact assessment	IIT climate groups, IMD collaborations, and national climate centres	MSc Climate Science; Numerical Weather Prediction; GIS/Remote Sensing; Climate Data Science
Ecology & Environmental Science	Biodiversity surveys, ecosystem monitoring, pollution measurement, restoration science	ICAR institutes, MoEFCC projects, state agencies	MSc Ecology & Environmental Science; Field Methods; Environmental Monitoring & Sensors
Quantum Technologies (cross-cutting)	Teaching labs (quantum optics), device fabrication, quantum algorithms, internships	DST/NQM nodes, AICTE-linked labs, IIT quantum centres	UG Minor: Quantum Technologies; M.Tech Quantum Technologies (model curriculum)

Teacher Training and Empowerment

- *Master Teacher Programmes*: Train selected teachers in MSV-relevant areas and make them local champions.
- *Workshops and Lab Visits*: Collaborate with institutions like IUCAA, BARC, or IISc to provide hands-on exposure for school teachers.
- *Digital Resources*: Develop e-content, simulation tools, and lab manuals that integrate mega-science themes.

Early Exposure and Talent Pipeline

- *Science Clubs and Olympiads*: Use mega-science themes to inspire participation in science fairs, quizzes, and olympiads.
- *Internships and Lab Exposure*: Enable high school students to visit labs, attend lectures, and engage with researchers.
- *Mentorship Programs*: Pair school students with university mentors working on MSV-aligned research.

AICTE-affiliated/ Autonomous Engineering Colleges and Universities

Following consultations, AICTE and DST (under the National Quantum Mission) have published model curricula for undergraduate minor degrees and M.Tech specialisations in Quantum Technologies. These model syllabi create a common baseline across institutions, standardize lab exercises and equipment lists, mandate internships and faculty development, and thus accelerate workforce readiness for quantum research and industry (18-21) Standardized curricula help scale teaching labs, improve inter-university credit mobility, and strengthen industry and national-lab linkages — all of which support MSV-2035's need for skilled personnel and technical capabilities.

MSPs: Practical Entry Points for HEIs

- ***LIGO-India:*** University optics labs can prototype suspension systems; CS departments can build low-latency analysis pipelines; physics departments can incorporate gravitational-wave data analysis into theses.

- ***TMT & SKA*:** HEI optics and photonics groups can contribute to mirror segment fabrication and adaptive optics; computational groups can build SKA pathfinder data pipelines and regional compute nodes.
- ***INO*:** Materials, mechanical and electronic engineering departments can prototype detector modules and front-end electronics; geology departments can support site assessment and environmental monitoring.
- ***Climate & Ecology*:** Universities can host observation networks, curate regional ecological datasets and run downscaled climate models for state-level policy and private-sector services.

Policy Recommendations

1. Fund curriculum modernisation tied to MSV priorities.
2. Create a national HEI–Mega-Science consortia programme with explicit deliverables.
3. Expand regional shared-facility networks to reduce duplication and increase access.
4. Fund faculty mobility and joint appointments to accelerate skills transfer.
5. Incentivise industry-readiness through university incubators and manufacturing roadmaps.
6. Make equity a requirement for consortia to broaden participation from underrepresented regions.
7. Support national certification and standardised modules (MSc/M.Tech) in MSV domains to promote credit transfer and faculty mobility.

Conclusion

MSV-2035 is as much an educational project as it is a scientific one. Its success depends on aligning HEIs with national mega-science goals through sustained curricular reform, shared infrastructure, strategic partnerships, and inclusive outreach. By converting classrooms into gateways and colliders into catalysts, India's universities can build a durable ecosystem of discovery, innovation and societal benefit. The moment to act is now: mega-science requires steady, decades-long preparation, and universities are uniquely positioned to deliver it.

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Appendix-1

Comments of The Scientific Leaders on the Preprint Shared for Perusal and Appreciation

Prof. T. G. Sitharam

Prof. T. G. Sitharam, Chairman, AICTE is a Senior Professor from the Department of Civil Engineering at IISc and was the Director of the Indian Institute of Technology Guwahati (IITG) for 3.5 years prior to his appointment. His work focuses on areas such as geotechnical infrastructure engineering, ocean and coastal zone management, earth sciences, hydrology, seismology, and natural hazards, and he was instrumental in the inception of the Chenab Railway Bridge project.

Comments : Strengthening university–research linkages and preparing our students for frontier science and emerging technologies is indeed vital for realising the vision of *Viksit Bharat* @2047.

Prof. Jainendra Jain

Prof. Jainendra Jain is Evan Pugh University Professor and Erwin W. Müller Professor of Physics, and holder of the Eberly Family Chair at Penn State University. He has been awarded the 2025 Wolf Prize in Physics for his pioneering theory of composite fermions, a transformative breakthrough in the understanding of two-dimensional electron systems under strong magnetic fields.

Comments: I find this to be an insightful article outlining how new universities and innovative teaching can spark India's next big leap in mega-science.

Prof. G U Kulkarni

Prof. G U Kulkarni is President, JNCASR and Adjunct Professor at CeNS, Bangalore

Comments: Indeed, a thought-provoking proposal. Any initiative to engage Indian universities in interdisciplinary research endeavours marks a significant step forward.

Prof. (h.c.) Sanjay Mathur

Prof. (h.c.) Sanjay Mathur, Past-President, The American Ceramic Society (ACerS), Director, Institute of Inorganic and Materials Chemistry, Chair, Inorganic and Materials Chemistry, University of Cologne, Germany.

Comments: This article powerfully argues that India's higher education system must evolve from classroom-centric teaching to collider-ready research, which implies a greater focus on research-oriented learning. The account illustrates how India's HEIs can transform into engines of innovation and workforce development to drive true self-reliance in high-tech and advanced manufacturing sectors.

❑

Historical Foundations: Management Learning in Ancient India

J Madegowda*

Management education in India has undergone a profound transformation, evolving from the traditional *Gurukul* system, where knowledge was imparted to the students in an intimate teacher-disciple relationship, to the establishment of modern business schools (B-schools) that align with global standards. The roots of management learning in ancient India can be traced back to writings such as *Arthashastra* by Kautilya, *Bhagavad Gita, Thirukkural*, etc., which provided greater insights into governance, strategy, and ethical leadership (Thang, 2013). Over the years, the colonial influence introduced the Western educational system, gradually shaping India's management pedagogy. The post-independence era witnessed the rise of prestigious institutions like the Indian Institutes of Management (IIMs), marking a shift toward structured curricula, case-based learning, and industry-oriented training. Today, Indian management education embraces a hybrid approach, integrating traditional wisdom with contemporary business practices to foster holistic leadership. This paper explores this evolutionary trajectory, critically analysing how India's educational heritage continues to influence modern managerial thought.

Significance of Management Education in India

Management education is crucial in nurturing leaders, entrepreneurs, and policymakers who are instrumental in steering economic and organisational development. In India, the development of management education has been intricately linked to its historical, socio-economic, and cultural milieu. The country's management education sector, spearheaded by esteemed institutions like the IIMs and leading B-schools, has garnered international acclaim for its stringent curricula and industry-focused teaching methods (Mahadevan, 2013).

However, long before the formalisation of management education in Higher Education Institutions (HEIs), India had a rich tradition of knowledge dissemination through the *Gurukul* system, where holistic education covered diverse subjects, including governance, economics, ethics, and leadership. Ancient texts such as the Arthashastra, Bhagavad Gita, and Thirukkural laid the foundation for strategic thinking, ethical leadership, and effective governance. The Shreni system (Guilds) of ancient India functioned as proto-corporations, demonstrating structured business practices, self-regulation, and cooperative economic models (Kothiyal, et al., 2017). Understanding this historical foundation is crucial to appreciating the evolution of management education in India and recognising its relevance even in this contemporary business environment.

Importance of Understanding Historical Roots before Analysing Modern B-schools

A comprehensive examination of management education should commence with an investigation into its historical foundations. Contemporary business education often emphasises Western management theories, including those advanced by Frederick Taylor, Henry Fayol, and Peter Drucker. However, India’s native management practices have predated these frameworks for centuries. The ancient Indian approach to management is significant not only for its practicality but also for its deep connections to ethical principles, sustainability, and human-centred governance (Singh, et al., 2020).

Analysing historical management philosophies helps draw parallels between traditional wisdom and modern business practices. For instance, the concept of servant leadership,[1] which has gained prominence in contemporary management thought, aligns with the teachings of the *Bhagavad Gita*, emphasising duty (*dharma*), selfless service, and ethical leadership (Singh, et al., 2020). Likewise, the strategic insights from Kautilya’s Arthashastra, written around the 4th century BCE, still impact business strategy, organisational behaviour, and public administration (Gupta, 2014).

Furthermore, recognising India’s ancient contributions to banking, commerce, and trade allows for a broader understanding of business sustainability. The maritime trade, Silk Route, and land-based trade networks that enabled economic

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prosperity demonstrate early instances of global business integration (Naresh, 2019). Revisiting these historical foundations enables modern B-schools to connect traditional wisdom with current global challenges like corporate governance, ethical dilemmas, and sustainable development (Sen & Chakraborty, 2017).

Influence of Ancient Indian Wisdom on Governance, Commerce, and Leadership

The legacy of ancient Indian wisdom is deeply ingrained in various aspects of governance, commerce, and leadership. Numerous classical texts offer insights into statecraft,[2] economic policy, and organisational leadership, providing invaluable lessons that remain relevant even in today's technology-driven business landscape.

Governance and Administration

The "Arthashastra" by Kautilya (Chanakya) is one of the earliest treatises on statecraft, diplomacy, and economic policy. It emphasises principles such as strategic planning, taxation, market regulation, and public welfare, aligning closely with modern economic policies (Boesche, 2003; Gupta, 2014; Morck et al., 2005). The Bhagavad Gita advocates ethical leadership, decision-making, and duty-oriented governance, which have applications even in today's corporate leadership and management.

Commerce and Business Ethics

The "Thirukkural" by Thiruvalluvar provides valuable insights into business ethics, wealth management, and leadership qualities. It emphasizes the importance of principles such as integrity, fair trade practices, and economic prudence that are integral to responsible business management today. The "Shreni" system (guilds) in ancient India functioned as early business organizations, demonstrating structured management, financial accountability, and workforce regulation (Hansmannt, 1980).

Leadership and Strategy

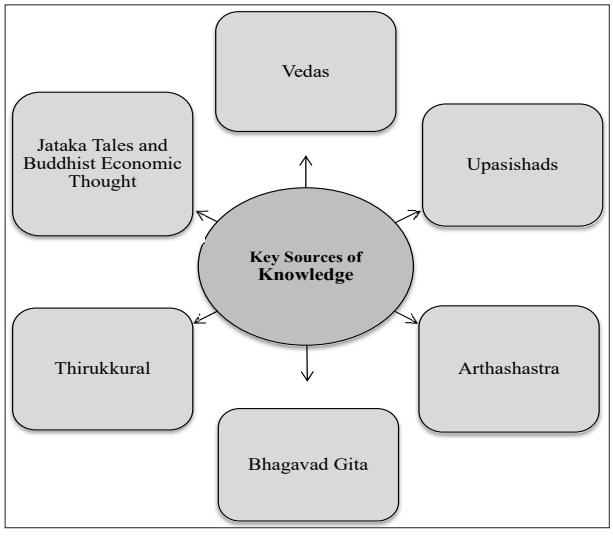
The Mahabharata and Ramayana, two Mahakavyas or grand epics, offer valuable insights into crisis management, conflict resolution, and team dynamics. Figures like Lord Krishna and Lord Rama serve as examples of situational leadership, ethical decision-making, and emotional intelligence. Additionally, ancient Buddhist and Jain teachings promote sustainable business practices and social responsibility, prioritizing non-exploitative commerce and the well-being of stakeholders (Naresh, 2019).

By integrating these philosophical and strategic teachings into the curricula of contemporary management programs, B-schools can nurture ethical leaders who balance profit with societal welfare (Thang, 2013).

Overview of Key Sources of Knowledge

The vast repository of Indian intellectual traditions includes scriptures, treatises, and practical governance models that laid the foundation for structured management thought. A few important and influential texts are identified below (Figure 1), followed by a brief description of each of the treatises.

Figure 1: Key Sources of Knowledge



The Vedas, comprising the Rigveda, Yajurveda, Samaveda, and Atharvaveda, serve as the foundational texts of ancient Indian knowledge, encompassing education, ethics, and societal organisation. These scriptures provide early references to governance, economic activities, and resource management. More specifically, the Atharvaveda discusses trade, finance, and taxation, offering insights into economic planning. Similarly, the Yajurveda provides principles of ethical leadership and fair administration, laying the foundation for structured governance and societal welfare.

Philosophical treatises on self-awareness and consciousness, such as the *Upanishads,* make significant contributions to leadership and decision-making wisdom. These treatises

emphasise introspection, ethical responsibility, and the role of knowledge in achieving enlightenment, concepts that align with modern ideas of visionary leadership and strategic foresight. By advocating for self-discipline and higher-order thinking, the Upanishads provide insights into the significance of moral integrity and long-term vision in managerial decision-making.

Kautilya's A*rthashastra* is a significant treatise on statecraft, diplomacy, and economic policies (Morck, et al., 2005). It offers comprehensive guidelines on governance, financial management, and military strategy. Additionally, it elucidates principles of taxation, market regulation, and trade policies, showcasing an advanced comprehension of economic administration. Moreover, it introduces concepts like competitive advantage, organisational hierarchy, and strategic planning, which maintain relevance in contemporary management practices.

The *Bhagavad Gita*, a sacred Hindu scripture, offers profound lessons on ethical and value-based leadership. Through its discourse on Karma Yoga (the path of selfless action), it imparts principles of duty, perseverance, and self-regulation, which are essential traits for leaders navigating challenges. It also addresses crisis management and decision-making under uncertainty, making it highly pertinent to modern corporate leadership, where resilience and ethical considerations are critical.

The *Thirukkural* by Thiruvalluvar is a classical Tamil text that offers profound insights into business ethics, governance, and sustainable economic growth. It underscores the importance of integrity, fair trade, and public welfare, promoting ethical behavior in leadership and commerce. Particularly, Thirukkural's teachings on wealth creation stress the significance of prudence, resourcefulness, and accountability, positioning it as a timeless resource for ethical business conduct.

The *Jataka Tales and Buddhist Economic Thought* contribute early notions of social entrepreneurship and responsible business practices. These stories underline the principles of mindful wealth creation, ethical trade, and leadership that prioritise social good over personal gain. The Buddhist emphasis on moderation and non-exploitative economic activities aligns with modern sustainable business models, encouraging Corporate Social Responsibility (CSR) and ethical capitalism.

These sources of knowledge not only provide historical insights but also act as guiding principles for contemporary management education, helping shape a balanced, ethical, and pragmatic approach to leadership and decision-making. The study of management education without the understanding of its historical roots is like studying a tree without considering its roots. This is because India's ancient texts and traditions offer a wealth of knowledge on governance, commerce, and leadership. Ancient Indian wisdom, embedded in scriptural texts, economic practices, and leadership philosophies, continues to inspire modern management principles. By integrating this knowledge into contemporary management education, B-schools can create a unique blend of traditional wisdom and modern innovation, fostering leaders who uphold ethical integrity, strategic thinking, and sustainable business practices (Thang, 2013).

Ancient Indian Learning Paradigms

The foundations of management education in ancient India were deeply rooted in a holistic educational framework emphasising ethical, intellectual, and practical development. The *Gurukul* system, an ancient Indian pedagogical model, was the cornerstone of this tradition, nurturing a personalised and immersive learning experience through the revered Guru-Shishya Parampara. This system not only imparted theoretical knowledge but also emphasised character building, ethical leadership, and practical wisdom, aligning with the principles of 'Dharma' (righteousness), Artha (wealth management), and "Rajaniti" (statecraft and administration). Centers of higher learning, such as Takshashila and Nalanda, functioned as early universities, attracting scholars from across the world and offering diverse courses/subjects, such as statecraft, administration, commerce, economics, and ethics. The pedagogy was predominantly oral traditions, interactive debates, experiential learning, and real-world application, ensuring that education was not confined to theoretical instruction but was instead a lifelong pursuit of wisdom and leadership acumen (Rbies, 2004). Against this backdrop, an attempt is made here to delve into the learning paradigms of ancient India, highlighting how these time-honoured educational models laid the foundation for contemporary management principles and ethical governance.

The Gurukul System

The *Gurukul* system was the cornerstone

of ancient Indian education, deeply rooted in the principles of holistic learning, ethical development, and character building. This system, prevalent from the Vedic period, was a residential education model where shishyas (students) lived with their gurus (teachers) in hermitages or ashrams, often in forests. Unlike contemporary institutionalised education, the emphasis of *Gurukul* was on personalised instruction, experiential learning, and moral development (Rbies, 2004). The overarching objective was cultivating wisdom rather than merely imparting information, ensuring that students acquired both intellectual and ethical competencies essential for societal leadership.

Structure and Pedagogy of Ancient Education

The structure of the *Gurukul* system was meticulously designed to foster the intellectual, spiritual, and physical development of *Shishyas.* The emphasis on Artha, Dharma, and Ethical Leadership prepared individuals to contribute meaningfully to societal development and welfare. Education was not confined to textual knowledge but instilled moral values, discipline, and a deep understanding of one's duties (*dharma*). The curriculum was expansive, covering subjects such as astronomy, economics, mathematics, medicine, military science, philosophy, statecraft, and Vedic literature. Instruction was predominantly oral, with students required to memorise scriptures and engage in discourse through dialogical methods such as debates (shastrarthas). The system depended on practical training, where students participated in daily chores, developing resilience, humility, and self-sufficiency (Chatterjee, 2012).

Role of Guru-Shishya Parampara in Knowledge Dissemination

The *Guru-Shishya Parampara* **(**teacher-student system) was the foundation of knowledge transmission in ancient India. This model emphasised personalised guidance, close mentorship, and ethical training, ensuring a deep-rooted understanding of wisdom rather than rote memorisation (Boesche, 2003). Unlike modern classrooms, where learning is often standardised, the *Gurukul* system allowed for individualised instruction tailored to each student's capabilities and aspirations. The guru was not merely an educator but also a spiritual guide, mentor, and moral exemplar, instilling values of self-discipline, humility, and ethical leadership. This system ensured the transmission of knowledge and wisdom from one generation to another, where wisdom was not just preserved but also evolved through interpretation and application. The key aspect of learning was discursive and exploratory, encouraging students to question, reflect, and engage in critical thinking, thereby fostering innovation and independent reasoning (Naresh, 2019). The relationship between guru and shishya was based on trust, reverence, and commitment, creating an immersive learning environment conducive to intellectual and moral growth.

Emphasis on Holistic Development

The *Gurukul* system was not only concerned with imparting academic knowledge but also focused on the holistic development of pupils, encompassing Dharma (righteous conduct), Artha (economic knowledge or prosperity), and ethical leadership. Pupils were trained to become not only learned individuals but also responsible members of society, capable of living or leading with wisdom, integrity, and compassion (Chatterjee, 2012). The curriculum included extracts from scriptures such as the Vedas, Upanishads, and Dharmashastras, which emphasised the interdependence of ethical governance, economic prudence, and social responsibility. Leadership training was an integral part of the curriculum, where pupils were taught decision-making skills, governance principles, and the significance of righteous conduct. This model, therefore, ensured that education was not merely utilitarian but also value-driven, nurturing leaders who prioritise societal welfare over personal gains.

Centres of Higher Learning

In addition to the *Gurukul* system, ancient India was home to renowned centers of higher education, attracting scholars from across the globe. Institutions such as Takshashila (Taxila) and Nalanda functioned as early universities, providing structured education in diverse disciplines. These centers exemplified the interdisciplinary nature of ancient Indian education, offering a wide range of subjects, including administration, commerce, economics, ethics, statecraft, etc., which shaped the intellectual landscape of the time. The teaching methodologies, characterised by oral traditions, debate, and experiential learning, fostered critical thinking and innovation.

Takshashila and Nalanda as Early Universities

Takshashila, located in present-day Pakistan and believed to have been established around 700

BCE, was one of the earliest known centers of higher learning. While not a university in the modern sense, it served as a vital hub for intellectual exchange, where scholars convened to pursue studies, conduct research, and participate in philosophical debates (Boesche, 2003). This institution was renowned for its demanding curriculum and distinguished faculty, which included notable figures such as Panini (Grammar), Chanakya (Statecraft), and Jivaka (Medicine) (Chatterjee, 2012).

Nalanda, located in present-day Bihar and established in the 5th century CE, stood out as one of the earliest and most esteemed residential universities globally, accommodating a staggering number of over 10,000 students and 2,000 faculty members at its zenith. It garnered acclaim for its interdisciplinary curriculum, encompassing a wide range of subjects, including Buddhist studies, Vedic scriptures, mathematics, astronomy, medicine, and administrative sciences. The university boasted an extensive library known as the *'Dharma Gunj*" (Mountain of Knowledge), which housed a vast collection of manuscripts deemed a treasure trove of global wisdom (Naresh, 2019).

Subjects Taught

Ancient centres of learning were renowned for their comprehensive and practical curricula, designed to equip students with the knowledge essential for governance, trade, and societal progress. Courses/subjects such as statecraft and administration, drawing primarily from texts like the Arthashastra, provided insights into diplomacy, taxation, financial management, and governance strategies (Chatterjee, 2012). Economics and commerce were integral components of education, emphasising the principles of fair trade, wealth management, and sustainable economic policies. Ethics and moral philosophy were also rigorously taught to ensure that future leaders balance economic ambition with ethical responsibility (Sen & Chakraborty, 2017).

Teaching Methodologies

The pedagogical approach in ancient Indian universities was primarily interactive, inquiry-driven, and experiential. Knowledge was transmitted through oral traditions, ensuring that students internalised concepts through repetition and discussion (Chatterjee, 2012). Debate and dialectics played a crucial role in fostering critical thinking, as evidenced in the Buddhist monastic education system, where students engaged in vigorous discussions (Vada-Vivad) to refine their understanding of philosophical and practical subjects (Naresh, 2019). Experiential learning was another hallmark of ancient education. Students were encouraged and obligated to apply theoretical knowledge through real-world experiences - studying governance structures, participating in trade practices, and engaging in community service. This methodology ensured that learning was not purely theoretical but deeply rooted in practical application, preparing students for leadership roles across political, economic, and social domains (Boesche, 2003).

The learning paradigms of ancient India were characterised by intellectual rigour, ethical responsibility, and experiential training, while the *Gurukul* system fostered personalised mentorship and character development. Centres like Takshashila and Nalanda served as pioneering institutions of higher education. The pedagogical methods employed, including oral traditions, debate, and practical application, laid a strong foundation for interdisciplinary and lifelong learning. Understanding these paradigms provides valuable insights for modern education systems and institutions, underscoring the need for ethics-driven, experiential, and student-centric learning models.

Management Thought in Ancient Indian Scriptures

The principles of management and leadership in ancient India were deeply rooted in its rich scriptural heritage, providing timeless wisdom on governance, strategy, ethics, and organisational leadership. These ancient texts not only shaped India's socio-political and economic systems but also continue to offer valuable lessons in modern management and ethical decision-making. Against this backdrop, an attempt is made here to explore the enduring relevance of these scriptures, drawing connections between ancient wisdom and contemporary leadership practices in business and administration.

Arthashastra by Kautilya

The Arthashastra, credited to Kautilya (also known as Chanakya), stands as one of the earliest treatises on administration, governance, and economic strategy. Penned around the 4th century BCE, it offers a structured framework for state governance, trade policies, and ethical leadership.

Kautilya stressed the importance of strategic planning, financial prudence, and the capacity to navigate evolving political and economic landscapes for effective governance (Banaji, 2018). His governance principles continue to exert influence on modern management, particularly in organisational strategy, public administration, and corporate leadership.

One of the key themes of Kautilya's Arthashastra is economic and trade policies. Kautilya outlined measures for maintaining a stable economy, which included regulating markets, preventing monopolies, and safeguarding the interests of consumers (Baba, 2018). He also detailed taxation, revenue collection, and wealth distribution, promoting a balance between state intervention and economic liberty (König & Whitmarsh, 2007). These principles remain pertinent in modern economic policies, especially concerning macroeconomic planning and regulatory structures (Chatterjee, 2012).

In addition to governance and economic policies, the Arthashastra underscores ethical leadership and public welfare. Kautilya advocated that the primary duty of a ruler was to ensure the well-being of his subjects, advocating for policies that promote social stability, justice, and economic prosperity (Steier, 2005). This perspective aligns with modern corporate social responsibility (CSR) initiatives, which emphasise ethical leadership and stakeholder welfare (Boesche, 2003).

Bhagavad Gita and Leadership Wisdom

The *Bhagavad Gita*, a philosophical discourse and a part of the Mahabharata, provides profound insights into leadership, decision-making, and ethical dilemmas. One of its core teachings, *Karma Yoga*, emphasises duty-driven leadership, advocating that a leader should work selflessly and focus on righteous conduct rather than personal gain (Pless et al., 2022). This principle is relevant even in contemporary leadership models that promote servant leadership and purpose-driven management (Chatterjee, 2012).

Furthermore, the Bhagavad Gita also addresses ethical dilemmas and decision-making. In the battlefield dialogue between Lord Krishna and Arjuna, Krishna advises Arjuna to uphold his duty as a warrior despite moral uncertainties. This underscores the importance of making difficult decisions with integrity and detachment—a crucial lesson for corporate leaders navigating complex ethical challenges in business environments (Franco, 2013).

Self-discipline and detached action are key management principles derived from the Bhagavad Gita. Leaders are encouraged to perform their duties and discharge their responsibilities without attachment to the results or rewards, fostering resilience, impartiality, and a focus on long-term organisational goals. These principles align well with contemporary notions of emotional intelligence and ethical decision-making in leadership (Singh, 2015).

Thirukkural and Managerial Ethics

Thirukkural, an ancient Tamil text by Thiruvalluvar, is a seminal work on ethics, leadership, and governance. It offers practical guidance on statecraft, wealth management, and personal conduct, emphasising qualities such as wisdom, courage, and compassion in leaders, which are highly relevant to contemporary management thinking. The text highlights the significance of integrity, fairness, and wisdom in leadership, asserting that a ruler or leader should prioritise justice and the welfare of their people (Kumar, 2018).

Wealth creation and economic prudence are central themes in the Thirukkural, emphasising the importance of ethical wealth accumulation and highlighting that economic prosperity should be attained through fair means and utilised for the betterment of society. This resonates with contemporary corporate governance principles that promote transparency, sustainability, and ethical conduct in business practices (Shiferaw, et al., 2013).

Furthermore, the Thirukkural promotes ethical business practices, cautioning against greed and exploitation. It emphasises the importance of trust, reliability, and mutual benefit in business transactions—values that are essential in contemporary business ethics and CSR (Rbies, 2004).

Criticisms and Debates Surrounding Ancient Management Paradigms

Although ancient Indian management philosophies offer valuable insights, their direct application in modern contexts requires scrutiny. Many scholars have raised critical concerns regarding the exclusivity, ethical dilemmas, and practical challenges embedded in these paradigms.

Limitations of the Gurukul System

Despite its emphasis on ethical leadership, personalised mentorship, and holistic education, the

Gurukul system had a few shortcomings that restrict its applicability in the modern world.

- ***Caste-Based Exclusion:*** The Traditional *Gurukul* system catered primarily to a select group of students, primarily from privileged backgrounds, and restricted access to a wider population and women. This exclusivity constrained the democratisation of knowledge, in stark contrast to current education systems that promote inclusivity and equal opportunity.
- ***Rigid Teaching Methodologies***: The oral transmission of knowledge, memorisation-based learning, and guru-dependent teaching methodologies left little room for structured curricula, empirical validation, or student-driven exploration—elements central to contemporary higher education models.
- ***Standardisation Issues***: Education under the *Gurukul* model was dependent on a single guru's interpretation, leading to a lack of a centralised system for standardising knowledge or evaluating learning outcomes, unlike modern examination and accreditation systems.

Although the personalised mentorship model of the *Gurukul* system has inspired contemporary executive development and leadership training, its exclusivity and rigidity require significant adaptation to align with today's equitable and evidence-based education models.

Ethical Dilemmas in Arthashastra's Approach to Power and Statecraft

Although Kautilya's Arthashastra is often praised for its pragmatic governance strategies, it has also sparked debates on its ethical implications in leadership and administration.

- ***Power-Centric Statecraft vs. Moral Governance***: The Arthashastra advocates for espionage, economic surveillance, realpolitik, and even deception, strategies that prioritise state power over moral considerations. However, while these principles ensure stability, they may contradict ethical leadership models that emphasise transparency, fairness, and corporate integrity.
- ***Welfare State vs. Authoritarian Rule***: Although Kautilya emphasizes the welfare of subjects, some scholars argue that his policies, such as high taxation and centralised economic control, resonate more with aspects of authoritarian governance rather than the participatory leadership evident in modern democracies and organisations.
- ***Influence on Modern Business Strategy***: While modern businesses leverage Arthashastra's competitive advantage and strategic planning models, ethical concerns emerge when profit maximisation takes precedence over social responsibility. Therefore, businesses must maintain a delicate equilibrium between strategic efficiency and ethical governance to prevent exploitative practices.

Although the Arthashastra remains a critical text for strategic thinking, its power-centric philosophy necessitates an ethical reinterpretation when applied to modern business and public administration.

The Bhagavad Gita in Leadership: Detachment vs. Social Responsibility

Despite the Bhagavad Gita's Karma Yoga (duty-bound action) acting as an influential leadership philosophy, its interpretation varies significantly across different schools of thought.

- ***Detachment from Outcomes vs. Corporate Accountability***: The Gita advises leaders to act with no attachment to results, focusing exclusively on their duty (dharma). While this principle fosters resilience and stress management, it may conflict with corporate accountability, where leaders must be responsible for business outcomes, stakeholder expectations, and social impact.
- ***Moral Justification for Leadership Decisions:*** Some interpretations of the Gita's battlefield discourse recommend that leaders must make tough decisions for the greater good, even if they involve moral dilemmas. However, this can be misused to justify unethical corporate decisions under the pretext of duty, raising concerns about moral subjectivity in business ethics.
- ***Servant Leadership vs. Strategic Detachment:*** While some leadership models emphasize service to stakeholders (servant leadership), others interpret the Gita's detachment as strategic impartiality in decision-making. The challenge lies in balancing ethical leadership with the practical realities of business competitiveness.

However, to apply the Gita's wisdom effectively, business leaders must integrate duty-consciousness with CSR, ensuring ethical leadership that aligns with modern accountability standards.

Commerce and Trade in Ancient India: Lessons in Business Management

Ancient India was a hub of vibrant commercial and trade activities with extensive domestic and international trade networks, well-structured guilds, and sophisticated financial systems. These arrangements contributed to India's reputation as a prosperous country and provided valuable insights into contemporary business management. The principles of market organisation, regulatory frameworks, financial prudence, and ethical business practices evident in ancient India continue to hold their relevance in modern management discourse.

Early Trade Routes and Their Managerial Implications

Ancient India's trade networks, such as land-based and maritime routes, were not merely conduits for economic exchange but also early models of supply chain management, risk mitigation, and cross-border trade control and management. The Silk Route and Maritime Trade Networks were instrumental in the movement of goods, ideas, and financial instruments, demonstrating principles that remain relevant to modern global trade (Carter & Mendis, 2002; Yannopoulos et al., 2015). For example, ancient Indian traders diversified their supply sources and established redundant trade routes, a principle akin to present-day risk management strategies in supply chain logistics. Similarly, trade agreements with foreign markets functioned as early bilateral trade treaties, ensuring fair practices and standardised transactional norms, much like modern free trade agreements (FTAs). Another crucial lesson from ancient trade practices is market regulation and price stabilisation. The presence of designated trade hubs ensured that goods were sold at fair prices, preventing monopolistic trade practices (Gikandi, 2018). This principle aligns with present regulatory frameworks, such as antitrust laws and government oversight in market economies (Neelis, 2011).

Guilds (Shrenis) as Early Corporate Structures

The guild system *(Shrenis)* in ancient India is one of the earliest models of self-regulated corporate entities, providing valuable insights into business organisation and governance (Hansmannt, 1980; Panda & Gupta, 2014). These guilds operated as proto-corporations, establishing operational standards, keeping accounting records, and ensuring ethical business practices. They functioned with internal governing councils, and these councils established business codes, ensured compliance, and resolved disputes—precursors to modern board governance and regulatory bodies like the Securities and Exchange Board of India (SEBI). Ancient guilds, unlike today's reliance on external audits and compliance measures, had self-imposed rules on quality control, fair wages, and dispute resolution, similar to modern industry associations like chambers of commerce. Guilds also managed collective funds, sanctioned and disbursed loans to the needy, and complied with tax obligations to the state exchequer – these are akin to today's corporate financial reporting and tax structures (Nivedita Kothiyal., Emma Bell., 2017). These early corporate structures and practices showcase how decentralised decision-making, ethical trade practices, and financial prudence were integral to ancient Indian business—a legacy that continues to shape modern-day corporate enterprises and professional trade bodies.

By studying these ancient trade and business organisations, contemporary business and industry leaders can draw insights into supply chain resilience, regulatory frameworks, corporate governance, financial transparency, etc.

Banking, Finance, and Taxation Principles in Ancient India

Ancient India had a sophisticated financial system with well-documented practices related to banking, credit, and taxation. Financial institutions, known as *Adhikaranas,* were responsible for supervising transactions, offering loans, and issuing promissory notes. Interest rates were tailored according to risk levels, showcasing an early understanding of financial risk management (Gupta, 2014). The concepts of loans, compound interest, debt settlement, and others were meticulously outlined in texts such as the Arthashastra, highlighting the importance of financial acumen.

Taxation policies were also well-designed in ancient India, with rulers imposing duties on trade, land, and various economic activities. The Arthashastra outlined the principles of state revenue collection, emphasising a minimal burden on the populace while ensuring the economic stability of the state (Aggarwal & Phadke, 2015). This balance between taxation and economic growth remains a fundamental principle in the modern fiscal policies of governments and corporate financial management.

Case Examples

The business acumen of Indian traders had a significant influence on global commerce. Indian merchants played an important role in shaping trade patterns in Southeast Asia, the Middle East, and Africa. The use of standardized weights and measures, innovative contract systems, and ethical business conduct set precedents for global business norms. The spice trade, textile industry, and metalworking techniques of ancient India had a significant impact on economies and cultures around the globe (Gupta, 2014). The diffusion of Indian trade practices also contributed to the commercial advancements in countries/regions like the Roman Empire and the Persian Gulf region.

The spice trade was a crucial and intrinsic aspect of ancient Indian commerce, with spices like pepper, cardamom, and cinnamon being highly prized in Europe and Asia. Indian traders held sway over the spice trade, shaping culinary traditions and economies globally. This trade exemplifies the influence of Indian commerce on international markets (Gupta, 2014).

The textile industry in ancient India was renowned for its high-quality cotton and silk fabrics. Indian textiles were traded extensively throughout Asia, Africa, and Europe, influencing fashion and design. This industry exemplifies India's significant contributions to global manufacturing and trade (Gupta, 2014).

Ancient India was renowned for its expertise in metalworking, particularly in iron, steel, and copper production. The advanced techniques developed by Indian metalworkers had a significant impact on the creation of tools, weapons, and infrastructure globally. This underscores India's pivotal role in technological innovation and trade (Gupta, 2014).

Additionally, ancient Indian principles of ethical trade, as found in Thirukkural and Jataka tales, underscored honesty, fair pricing, and responsible commerce. These values continue to influence business ethics and CSR in the contemporary world. The commercial and trade practices of ancient India provide profound lessons in business management, emphasising strategic expansion, ethical business conduct, financial prudence, and regulatory frameworks. Understanding these foundational aspects enriches modern business perspectives and reinforces the relevance of historical wisdom in contemporary economic strategies.

Relevance of Ancient Wisdom in Modern Management Education

The principles enshrined in ancient Indian wisdom and texts remain highly relevant in modern management education. The philosophical, strategic, and ethical frameworks found in historical texts provide valuable insights for today's B-schools, helping them cultivate leaders who can effectively balance economic success with ethical responsibility. By revisiting these foundational principles, management education can nurture holistic leadership, informed decision-making, and sustainable business practices.

Application of Ancient Indian Wisdom in Contemporary Business Practices

The principles enshrined in ancient Indian texts continue to influence modern industry leadership, governance, and business ethics (Thang, 2013). Many Indian corporations have effectively incorporated these time-honoured philosophies and principles into their business strategies, demonstrating their enduring relevance in contemporary business and management.

Infosys and Ethical Leadership from the Bhagavad Gita

Infosys is a global leader in next-generation digital services and consulting, and one of the leading IT firms in India, has long emphasised ethical leadership and value-based decision-making, principles deeply rooted in the Bhagavad Gita's concept of Karma Yoga. The company's co-founder, N. R. Narayana Murthy, has frequently articulated the importance of duty (*dharma)* over personal gain, a central doctrine of the Gita. Infosys' strong corporate governance framework, transparent business practices, and commitment to stakeholder welfare over short-term profitability exemplify the Gita's leadership philosophy in action.

Tata Group and Sustainability from Arthashastra

The Tata Group, a highly respected and widely known conglomerate for its long-standing commitment to social responsibility and ethical business practices, draws parallels with Kautilya's Arthashastra, which emphasised state welfare, financial prudence, and responsible wealth creation. Under the leadership of Ratan Naval Tata (1937-2024), the Group has championed sustainability-driven innovation, as seen in projects like Tata Nano (affordable innovation for societal benefit),

Tata Power's renewable energy initiatives, etc. The Tata Group has maintained profitability while prioritising community development and employee welfare, much akin to the Arthashastra's principles of balancing economic ambition with social responsibility.

Wipro and Ethical Governance inspired by Thirukkural

Drawing inspiration from ethical philosophies similar to the Thirukkural, Wipro has established itself as a company known for philanthropy, fair business practices, and leadership integrity. Azim Premji's philanthropic endeavours mirror the Kural's focus on using wealth for the betterment of society, highlighting the idea that business success should contribute to the welfare of the community. Additionally, Wipro's robust ethical governance framework, which encompasses stringent whistleblower policies and transparent corporate practices, resonates with Thirukkural's emphasis on just governance and accountability.

Incorporation of Ancient Indian Management Principles in B-School Curricula

Recognising the relevance of ancient Indian wisdom, several B-schools in India have integrated the Indian ethos in management into their curricula. For example, IIM Ahmedabad and IIM Bengaluru, two top B-schools established by the Government of India, offer elective courses on Indian management thought, exploring leadership insights from the Arthashastra, Bhagavad Gita, and Thirukkural in corporate decision-making. SP Jain Institute of Management and Research, a private B-school, has introduced a program on values-based leadership, drawing from Indian scriptures to teach ethical decision-making and responsible business conduct. Another private B-school, XLRI Jamshedpur, incorporates spiritual leadership and business ethics from ancient Indian texts into its human resource management and leadership courses.

By blending traditional wisdom with modern business practices, these B-schools prepare leaders who can balance profit with societal welfare, navigate ethical dilemmas, and practice sustainable leadership—values deeply ingrained in Indian philosophical traditions. This approach enhances academic rigor by incorporating empirical examples rather than abstract discussions, increases relevance by illustrating practical applications of ancient Indian wisdom, and strengthens credibility by referencing real-world corporate and educational initiatives.

Challenges of Integrating Ancient Ethical Principles into Modern Business

While ancient Indian ethical frameworks provide timeless insights into leadership and governance, integrating these principles into modern business environments presents a few challenges.

One of the major obstacles is the rigid hierarchical structure of traditional paradigms. Ancient management models often emphasised a top-down leadership approach, where authority was concentrated in a single leader or guru, leaving little or no room for participative decision-making. In contrast, modern corporate enterprises favour a collaborative approach and decentralised management structures, where powers are delegated across teams to foster innovation and inclusivity. Applying ancient models in contemporary organisational settings requires adapting their wisdom to more flexible and participatory frameworks.

Another key area of concern is gender inclusivity. It may be noted that traditional Indian educational and managerial models primarily catered to male students and leaders, with very limited roles for women in governance and decision-making. However, in today's corporate world, inclusivity and diversity are central to sustainable growth. While ancient scripts such as the *Thirukkural* and *Arthashastra* acknowledge the role of women in society, their direct application requires reinterpretation to align with contemporary principles of gender equality and workplace inclusivity.

Finally, the practical limitations of dharma-based leadership pose challenges in modern corporate governance. For instance, the *Bhagavad Gita* emphasises duty (dharma) and selfless leadership. However, the strict adherence to these principles may sometimes clash with profit-driven business goals and the realities of the corporate world. Ethical dilemmas in corporate settings, like balancing stakeholder interests or making difficult financial decisions, call for a nuanced application of dharmic principles that are in line with CSR and ethical capitalism rather than a rigid moral code that may not always be practical in fast-paced business environments.

Nonetheless, by critically analysing these limitations, contemporary management education can draw valuable lessons from ancient wisdom while adapting them to meet the dynamic needs of modern businesses.

Conclusion

The historical foundations of management education in India provide a rich repository of insights that continue to influence contemporary business practices. Ancient Indian scriptures and learning systems emphasised governance, ethics, leadership, and economic prudence—principles that remain integral to modern management thought. The Arthashastra provided a comprehensive framework for administration, strategic governance, and economic policies (Boesche, 2003), while the Bhagavad Gita offered timeless wisdom on leadership, ethical dilemmas, and self-discipline. Similarly, Thirukkural underscored the importance of moral leadership, economic prudence, and ethical business practices. These teachings collectively highlight a holistic approach to management that balances economic objectives with ethical imperatives.

The evolution of management education from the *Gurukul* system to modern B-schools shows an enduring commitment to mentorship, experiential learning, and value-based leadership. Ancient institutions such as Takshashila and Nalanda pioneered structured education in administration, commerce, and statecraft, setting the stage for modern-day institutions that emphasise critical thinking, strategic planning, and decision-making. The transition from oral traditions and philosophical discourse to case-based methodologies and digital learning platforms demonstrates the adaptability of ancient wisdom in developing and imparting contemporary business education.

Understanding the historical foundations of management education allows for a deeper appreciation of the core values that underpin business leadership and organisational success. The principles of ethical governance, holistic leadership, and responsible economic policies, as envisioned in ancient Indian thought, remain relevant in today's fast-evolving business environment. By integrating these insights into modern management curricula, B-schools can cultivate leaders who are not only strategic thinkers but also ethical decision-makers committed to sustainability and social responsibility.

End Notes

(1) 'Servant leadership' is a leadership philosophy where leaders prioritise their team or community's growth, well-being, and development rather than seeking power or personal gain. The core idea is that a leader is first a servant, and through selfless service, he/she inspires and empowers others to achieve collective goals. Servant leadership in the Indian tradition is about leading with compassion, responsibility, and selfless service to create a more inclusive and empowered society. A glimpse of ancient Indian perspective on Servant Leadership can be obtained from the following:

(a) In *Bhagavad Gita*, Lord Krishna's guidance to Arjuna embodies servant leadership to live/lead with humility, wisdom, and a sense of duty towards society.

(b) Upanishads advocate the idea of a leader being a guru (guide) who nurtures and uplifts followers through knowledge and ethical conduct.

(c) Chanakya's Arthashastra emphasises Rajarishi (philosopher-king) leadership, where rulers should be selfless, just and focus on public welfare rather than personal gains.

(d) Mahatma Gandhi's principle of Sarvodaya (welfare of all) is a modern expression of servant leadership, emphasising ethical leadership, humility, and service to others.

(2) 'Statecraft' refers to the art of governance, political wisdom, and leadership that are necessary for ruling a kingdom properly and effectively.

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Binary Accreditation System of National Assessment and Accreditation Council: Challenges, Opportunities, and Strategic Pathways for Quality Assurance

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Quality education is vital for any nation's social and economic development, and thus, it assumes even greater importance for humanity. Higher education is a key driver of emerging knowledge economies like India (Pattil,2018). Higher education drives teaching, research, and extension, supplying essential human resources for various fields. It fuels scientific progress, economic growth, and technological innovation, shaping a nation's development (Hota & Sarangi, 2019). India's higher education system, one of the largest and most diverse in the world, has undergone significant transformation due to privatisation, expansion, increased institutional autonomy, and the introduction of programmes in emerging domains. While these developments have improved accessibility, they have also raised concerns about the quality and relevance of higher education. In response, the National Education Policy (NEP) 2020 envisions a transformative framework emphasising multidisciplinary education, digital learning, and skill-based development, aligning with initiatives such as *Viksit Bharat (Hamara Sankalp Viksit Bharat,2025*) and *Skill India Digital* (Skill India Digital Hub (SIDH), 2025). In order to comply with the National Education Policy (NEP) 2020, the NAAC intends to align the assessing and accrediting procedures in higher education (Shinde & Wankhede,2020).

The need for quality assurance and accreditation has been established, especially in globalisation and financial constraints impinging on higher education (Dey, 2011). The Indian education system urgently requires substantial reforms to retain talent and ensure future generations contribute effectively to the nation's growth and development (Sivasthava, 2024). These reforms reinforce the need for a robust accreditation system that ensures quality assurance and institutional excellence. Against this backdrop, the National Assessment and Accreditation Council (NAAC), established in 1994 as an autonomous body under the University Grants Commission (UGC), plays a pivotal role in evaluating and enhancing the standards of Higher Education Institutions (HEIs). NAAC's mandate is to integrate quality assurance into the core functions of HEIs, operating through its General Council (GC) and Executive Committee (EC), which include eminent academicians, policymakers, and educational administrators. NAAC's accreditation framework is built upon five core values: contributing to national development, fostering global competencies among students, inculcating a value system, promoting the use of technology, and striving for excellence. Institutions undergoing accreditation are assessed based on seven criteria: curricular aspects, teaching-learning and evaluation, research and consultancy, infrastructure and learning resources, student support and progression, governance and leadership, and innovations and best practices (NAAC,2025). The NAAC has continuously refined its assessment methodologies, incorporating insights from international quality assurance agencies and aligning with global standards in higher education. Its evolving approach underscores the importance of self-evaluation, institutional accountability, autonomy, and innovation in higher education. With globalisation and digital transformation reshaping Indian higher education, quality assurance mechanisms such as NAAC's accreditation process are critical for positioning HEIs within a competitive global framework. The *Viksit Bharat* vision and the Skill India Digital initiative emphasise integrating digital skills, technological advancements, and competency-based education, reinforcing the role of accreditation in ensuring institutional preparedness for the future. HEIs operate within a complex ecosystem, balancing national regulations, societal expectations, and stakeholder needs. In this context, NAAC's Assessment and Accreditation (A&A) framework is a strategic tool

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for standardising quality, promoting transparency, and ensuring academic excellence. As NAAC advances its binary accreditation system, it must navigate opportunities and challenges, fostering a culture of continuous improvement and quality sustenance in higher education. Before proceeding, a glance at the status of accreditation would be helpful.

Table 1 data highlights the total number of accredited Higher Education Institutions (HEIs) in India as of January 16, 2025, with 419 universities and 6,846 colleges, totalling 7,265 accredited institutions. Table 2 shows that most institutions fall into mid-tier categories, with B (27%), B+ (17.9%), and B++ (16.8%) making up over 60% of the total. Only a small percentage (12.7%) have achieved the top A++ (3.5%) and A+ (9.2%) grades, indicating that very few institutions meet the highest quality benchmarks.

Table 1: Total Number of Accredited Institutions (As of 16/01/2025)

Type of Higher Education Institution	Number of Accredited Institutions
Universities	419
Colleges	6,846
Total	7,265

Source (s): National Assessment and Accreditation Council (NAAC), http://naac.gov.in/index.php/en/, Accessed on March 05, 2025.

Table 2: Accreditation Grades under RAF (July 1, 2017 – February 27, 2025)

Grade	Percentage	Number of HEIs
A++	3.5%	302
A+	9.2%	800
A	15.5%	1,347
B++	16.8%	1,461
B+	17.9%	1,559
B	27%	2,354
C	9.6%	833
D	0.7%	61
Total	100%	8,717

Source(s): National Assessment and Accreditation Council (NAAC), http://naac.gov.in/index.php/en/, Accessed on March 05, 2025

Revised Accreditation Framework (RAF) and Accreditation Procedures

The Revised Accreditation Framework (RAF) marks a transformative shift in the accreditation process, integrating Information and Communication Technology (ICT) to enhance objectivity, transparency, scalability, and robustness. Unlike the earlier qualitative peer review approach, RAF emphasises data-driven assessment and structured benchmarking, ensuring a fair and comprehensive evaluation of Higher Education Institutions (HEIs). RAF was primarily subjected to quantitative data analysis over subjective peer reviews intended for fairness and transparency, followed by Digital tools to streamline the evaluation process by minimising in-person visits, reducing administrative burdens, and enabling real-time data validation. The accreditation score is determined through peer review (30%) and online assessment (70%), ensuring a balanced evaluation. An external validation mechanism was initiated to foster the reliability and accuracy of submitted data. It was evident that the updated evaluation criteria now include increased participation from students and alumni to provide a holistic assessment. Different benchmarks are applied to universities, autonomous colleges, and affiliated/constituent institutions, ensuring context-specific assessments.

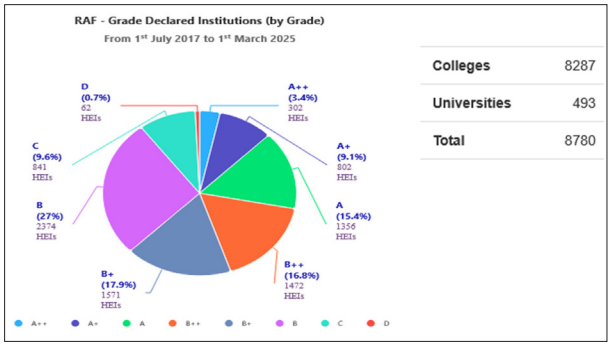
The assessment framework is structured around seven key criteria that determine the performance and quality of HEIs, and the evaluation was subjected to Curricular Aspects, Teaching-Learning and Evaluation, Research, Innovations and Extension, Infrastructure and Learning Resources, Student Support and Progression, Governance, Leadership, and Management and Institutional Values and Best Practices.

RAF had a well-laid Accreditation Procedures formulated by NAAC, which included structured phases to ensure systematic and comprehensive evaluation:

1. ***Integration of IIQA and SSR*:** The Institutional Information for Quality Assessment (IIQA) and Self-Study Report (SSR) are initial indicators of an HEI's commitment to accreditation and assessment.
2. ***Data Validation and Pre-Qualifier Score*:** Institutions undergo an online evaluation of submitted data. Those scoring below 30% on Quantitative Metrics (QnM) indicators are ineligible for further assessment.
3. ***Student Satisfaction Survey (SSS):*** A crucial step, this survey gathers feedback from at least 10% of enrolled students to assess institutional effectiveness.
4. ***Onsite Peer Review and Final Assessment*:** Institutions meeting the minimum qualifying score proceed to an onsite evaluation by a NAAC-nominated peer review team, which assesses qualitative parameters.

Figure 2 indicates RAF (Revised Accreditation Framework-Grade declared institutions (by grade)

Figure 2: RAF (Revised Accreditation Framework-Grade Declared Institutions (by Grade)



Source(s)- *Figure from National Assessment and Accreditation Council (NAAC), http://naac.gov.in/index.php/en/, Accessed on March 05, 2025.*

Implementation of Binary Accreditation

The Revised Assessment and Accreditation (A&A) Framework, introduced in July 2017 by the NAAC, marked a paradigm shift in the accreditation process by integrating ICT-enabled, data-driven methodologies that ensure objectivity, transparency, scalability, and robustness. This framework introduced key changes, including data-based quantitative indicator evaluation, extensive use of ICT, process simplification, benchmarking against international Quality Assurance (QA) frameworks, and a shift towards system-generated scores (SGS) comprising approximately 70% online evaluation and 30% peer judgment. Additionally, a pre-qualifier threshold (25% of SGS) was introduced before peer visits and third-party data validation to enhance credibility.

In alignment with this transformation, NAAC has proposed the Binary Accreditation System, which simplifies the accreditation outcome into three categories: Accredited**,** Provisionally Accredited, and Not Accredited. This model provides a streamlined approach, allowing institutions that are not accredited to reapply after six months, while those provisionally accredited must address recommendations within one year before seeking full accreditation. The eligibility criteria for Binary Accreditation differ slightly from the general NAAC framework, requiring Higher Education Institutions (HEIs) to have at least one batch of graduates or a minimum of four years of existence before applying. The assessment structure of Binary Accreditation retains the seven core criteria used in the current accreditation framework.

Unlike the traditional accreditation model, Binary Accreditation relies solely on Qualitative Metrics, requiring HEIs to submit a Self-Study Report (SSR**)** with detailed qualitative descriptions (1,000–1,500 words per criterion). Given the qualitative nature of this model, no Data Validation and Verification (DVV) process is required. The evaluation is conducted by a peer team, which assesses institutions based on their SSR and onsite observations. Peer reviewers submit a criterion-wise assessment report (1,000–1,500 words), including an analysis of strengths, weaknesses, opportunities, challenges (SWOC), recommendations, and a Peer Review Score Sheet (PRSS).

The final accreditation status is determined using a Cumulative Grade Point Average (CGPA), which is internally computed but not displayed on the accreditation certificate. The classification is as follows:

- Accredited: CGPA > 2.00
- Provisionally Accredited: 1.50 < CGPA < 2.00
- Not Accredited: CGPA < 1.50

This model ensures institutions can improve based on feedback, fostering continuous quality enhancement. By eliminating quantitative metrics and simplifying accreditation outcomes, Binary Accreditation enhances accessibility while maintaining rigorous quality assurance standards in higher education (NAAC,2025).

Transitioning from RAF to Binary Accreditation

The National Education Policy–2020 (NEP, 2020) paves a firm footing for a transformative shift in India's education system, significantly focusing on holistic, multidisciplinary learning and skill development. To align with the National Education Policy 2020 (NEP, 2020), it is imperative to strengthen the assessment and accreditation mechanisms of Higher Education Institutions (HEIs). It even envisions the establishment of the National Accreditation Council (NAC) as one of the key verticals under the proposed Higher Education Commission of India (HECI), aiming to strengthen the assessment and accreditation mechanisms of higher education in India. However, as NAAC moves toward this new-fangled model, it is important to understand its implications, benefits, and challenges for HEIs across India.

The Government of India has proposed these reforms with a strategic intent to strengthen the Vision of NEP- 2020 to develop a simple, trust-

based, credible, objective, and rationalised system for approval, accreditation, and ranking of HEIs with the following key objectives:

- A centralised database that is secure and verifiable.
- Modern systems are driven by robust technology to minimise/replace manual involvement.
- Mentoring and incentivising towards eminence, significance, and global acclaim.

To envision the National Accreditation Council (NAC) at the national level, NAAC has decided to transition from the Revised Accreditation Framework (RAF) to a Binary Accreditation Framework to simplify the accreditation process and enhance transparency, which is considered to be a transformative approach to higher education accreditation in India, equipping institutions to meet essential quality benchmarks. The proposed model adopts a Yes/No (Accredited/ Not Accredited) model, which intends to enhance transparency, simultaneously reduce subjectivity, and significantly streamline the accreditation process. By not focusing on comparative rankings, the proposed framework ensures that HEIs meet or fail to meet accreditation standards, developing a more objective and data-driven assessment. The binary framework aligns with the National Education Policy (NEP) 2020, emphasising digital integration, institutional accountability, and outcome-based education. The evaluation will be based on Curriculum, Faculty Resources, Learning and Teaching, Research and Innovation, Extracurricular (EC) and Co-Curricular (CC) Activities, Community Engagement, Green Initiatives, Governance and Administration, Infrastructure Development and Financial Resources and Management.

The proposed shift of NAAC from RAF to the Binary Accreditation Framework has been considered a milestone addressing the limitations of the NAAC Accreditation framework. The prime focus was simplifying the accreditation process and enhancing transparency by making it more objective, transparent, and data-driven. Many colleges and universities hesitate to undergo NAAC accreditation because the fear of securing lower grades (B, C, etc.) affects their reputation. Most institutions often aimed for higher grades rather than continuous improvement under the RAF. However, with the binary system, HEIs' focus has to shift to meet quality benchmarks and gradually enhance their standards to get accredited.

The proposed Binary Framework encourages accredited institutions to elevate their bar gradually (Level 1' to 'Level 4 of Institutions of National Excellence and Level 5 Institutions of Global Excellence for Multidisciplinary Research and Education (as envisioned in NEP 2020)) and drastically Simplify the Accreditation process, specifically for the HEIs going for the first cycle and the Periodicity for Re-accreditation may be brought down (from five years as followed now). Rather than a one-size-fits-all model, considering the heterogeneity of HEIs in the country, HEIs may be categorised (Based on orientation/vision and heritage/legacy), and information will be sought (Table 3).

Table 3: Suggested Category of HEIs

Criteria	Suggested Category of HEIs
Orientation and Vision	• Multidisciplinary Education and Research -Intensive • Research-Intensive • Teaching-Intensive • Specialized Streams • Vocational and Skill-Intensive • Community Engagement & Service Rural & Remote Location
Heritage and Legacy	• Old and Established • New and Upcoming

Source(s): *Report of the Overarching Committee, constituted by the Ministry of Education, November 2023. Published by the Department of Higher Education, Ministry of Education, Government of India*

The proposed framework intends to meet minimum quality standards rather than competing for higher grades, as the previous system involved physical visits, where peer team members had more discretion in their evaluations. However, the recent reformation significantly reduced the pressure to influence peer teams for a better score. In the proposed binary framework, higher use of AI, data analytics, and automation significantly minimises human intervention and makes it more challenging for peer teams to manipulate scores.

The ONOD (One Nation One Data) device is proposed to centrally capture all common data used by agencies like AISHE, UGC, AICTE, NAAC, and NBA/NIRF to strengthen the Binary Accreditation Framework. It is expected to capture all stable variables, such as programmes, students, and faculty, used by all agencies to be captured and validated. Post-development of ONOD significantly minimises redundant efforts and errors, ensuring consistency. Soon, the introduction of Binary and Maturity-Based Graded Accreditation (Levels 1 to 5) will be implemented by making ample modifications in the manuals (metrics, measures, benchmarks,

etc). A maturity-based graded accreditation model can complement the binary system by incentivising excellence and innovation beyond minimum compliance (Pharmabiz,2024). Binary Accreditation Framework is largely based on quantitative assessment with a very minimal review through an online mode. Data verification and validation will be carried out collectively by the involved agencies using appropriate scientific methodology. "Stakeholder Crowdsourcing" methodology has been proposed, which includes students, faculty, alumni, industry, parents, and academic scientific peer groups - effectively society at large, as part of the accreditation and ranking process as a novel attempt to validate the data submitted by the HEIs, However, the proposed maturity-based graded accreditation methodology shall include qualitative peer assessment through the qualitative peer expert's assessment (PEA). It is expected to include parameters set as benchmarks deeply rooted in the objectives of NEP 2020, SDG/G20, and other national priorities articulated through various Ministries and Departments of the Government of India.

The proposed framework intends to meet minimum quality standards rather than competing for higher grades, as the previous system involved physical visits, where peer team members had more discretion in their evaluations. However, the recent reformation significantly reduced the pressure to influence peer teams for a better score. In the proposed binary framework, higher use of AI, data analytics, and automation significantly minimises human intervention, making it more challenging for peer teams to manipulate scores.

Conclusion

The Binary Accreditation System represents a paradigm shift in India's higher education quality assurance framework, aiming to enhance accessibility, streamline processes, and promote institutional inclusivity. However, as this transition unfolds, it is imperative to critically assess its long-term impact on institutional excellence, global comparability, and the overall credibility of higher education in India. While the simplicity and inclusivity of binary accreditation may encourage broader institutional participation, its inherent limitations—such as lack of granular differentiation, risk of subjectivity in assessments, and reduced incentives for continuous quality enhancement must be addressed to ensure that it does not inadvertently compromise academic standards. The binary system, in contrast, flattens this distinction, reducing accreditation to a mere compliance check rather than a dynamic quality enhancement tool. This shift may also weaken India's position in global higher education rankings, as many international quality assurance frameworks rely on detailed, multi-tiered accreditation models.

Another critical issue that warrants attention is the potential for unhealthy accreditation practices. Institutions may resort to short-term compliance measures rather than genuine, long-term academic improvements without a rigorous, data-driven evaluation. Transparency, accountability, and adherence to ethical evaluation standards must be reinforced to prevent dilution of accreditation credibility. Process reformations by NAAC, by eliminating grading-related stress from RAF to the Binary Accreditation Framework, were intended to increase institutional participation and promote a more objective and transparent evaluation system by simplifying accreditation. Ultimately, the goal of any accreditation system should be to empower institutions, uphold academic rigour, and drive sustained educational excellence. If NAAC's Binary Accreditation System is to serve as a transformative force, it must be continuously refined, globally aligned, and ethically administered. The future of Indian higher education depends not just on simplified accreditation mechanisms but on a robust, transparent, and innovation-driven framework that fosters real institutional growth and global competitiveness.

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Lessons from Science: Insights for a Bright Future

Sanjay Behari, Director, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram and President, Medical Assessment and Rating Board, National Medical Commission delivered the Convocation Address at the 38th Convocation Ceremony at the Sri Ramachandra Institute of Higher Education and Research, Chennai on December 11, 2024. He said, ***"The deeply engrained thought that this is your institute whose name you will represent throughout your lives, in whatever endeavors you undertake, and in every thought, word, and deed, is the over-riding factor that decides the success of your institute. You must never let go of this deep all-encompassing bond that you have notionally and subconsciously established with your institute. This firm belief is and will be responsible for your eminence as well as that of your institute."*** **Excerpts**

I am grateful to Shri V. R. Venkataachalam, Honourable Chancellor, Dr. Uma Sekar, Hon. Vice Chancellor, Dr. Mahesh Vakamudi Pro-Vice Chancellor, Sri Ramachandra Institute of Higher Education and Research, and the fraternity of this revered institute for having invited me. I congratulate all the graduands who are being awarded their degrees today. I congratulate the prize winners of the batch for attaining the position of being the ''best among equals'' through their extra hard work and dedication. I also congratulate the teachers, parents and siblings of the graduands for their immense contribution towards the success and accolades the degree awardees are achieving today.

I would like to share three fascinating lessons of science with you and the messages that emerge from them. All of them are true concepts and come from different branches of science.

The first Lesson comes from the Incremental work Carried out in the field of Astronomy.

Story of the Rainbow

We all know that the rainbow appears as a semicircle, having seven colours depicted by the acronym, VIBGYOR, which represents violet, indigo, blue, green, yellow, orange and red. All rainbows are actually full circles, but only an arc or semicircle is seen because the beholder is standing on the ground and the other half of the circle is cut oL by the horizon.

Newton was the first to discover that once the white sunlight has passed through the prism and has been refracted, it not only changes direction to shine onto the opposite wall, it also separates into seven colours showing the rainbow eLect. Joseph von Fraunhofer discovered that when the solar light is broken into the seven colours of the rainbow, the rainbow spectrum is always accompanied by black vertical lines in between at specific intervals.

Bunsen invented a gas burner that produced a clean, non-luminous flame that could be used to test the chemical composition of various substances. Bunsen and KirchhoL then used a prism to analyse the light emitted by substances heated in the Bunsen burner. They discovered that each chemical element produces a unique pattern of spectral lines. They realised that the absorption lines that appeared as black vertical lines on the rainbow spectrum, produced by the white light from the sun, were a result of the light energy being absorbed by specific elements of the sun. Thus, based on these lines, the composition of the sun and other stars in the galaxy may be determined. Doppler determined that galaxies moving away from us cause the Fraunhofer's black vertical lines to move towards the red side of the spectrum; and, one galaxy, the Andromeda galaxy, that is moving towards our galaxy, the milky way, and may collide with it one day, shows a blue shift of the Fraunhofer's black vertical lines. When one focuses on light spectrum emanating from one galaxy in space, based on the amount of shift of the absorption spectrum of the rainbow, one can calculate the relative velocities of these galaxies. Finally, after the proposal that light had a constant velocity, approximately 300,000 km per second, given by Einstein, it is now possible to determine how far the galaxies emitting red shift of the black absorption lines of the rainbow, are from us; and also, how far back in time that light is coming from. Thus, the history of the universe has been gauged from the simple rainbow that we all have observed from our childhood.

Every discovery and innovation is based on and is influenced by the work done by the preceding contributions to the knowledge pool. When does the work change from being only an incremental change to a really disruptive discovery? When the incremental changes reaches a point of criticality; and when the immense potential of the incremental discoveries and innovations starts benefiting mankind. Therefore, do not discard any idea that has suddenly come to you. Work with whole-hearted enthusiasm to take your idea to its final conclusion, based on your perception. Do not think that your inputs do not matter to others. Each one

of us has to go through the same thoughts of insecurity and the fear of failure to reach where we are supposed to reach. What overcomes these negative thoughts are two important and overriding beliefs: The first is, "I shall accept each aspect of my successes and failures with equanimity and enthusiasm"; and, "If a particular positive thought or idea has come to my imagination or dreams, it just requires my relentless pursuit to make the dreams come true.

Whatever one can imagine is true. Every important discovery or innovation is based upon incremental changes contributed by one's predecessors engaged in the same line of work; therefore, every contribution to that line of thought process, including that contributed by yourself, is invaluable to propel it forwards towards an incremental change.

The Second Lesson comes from the Mathematical principles of physics.

The Fourth Dimension

The fourth dimension starts with the premise that time changes based on the perception and position of the observer relative to the event. Any point in a three-dimensional space can be described by its three coordinates. If you want to go from one point to another, you can define the point by marking its three coordinates along the x, y and z axis. Based on this visualisation, you know the path to the next set of coordinates. If you open the page of a book, you can again define the sentence that you are reading in three dimensions using the same x, y and z coordinates. Based on these coordinates, your mind plans to reach the next set of coordinates, that is, the last sentence of that book. If you're focusing on a task in hand, again you can pictorially extrapolate it in terms of its three coordinates, as it gives a very good representation of your location at the start of the work, as well as focuses your mind on the envisaged coordinates at the completion of the work. While you were studying for your examinations, your mind was subconsciously picturizing the coordinates of this convocation that represents the completion of your course. Once you gets a mental picture of the coordinates, you can rehearse the steps of the task relative to those coordinates in your mind even before you start the actual task. Once the task can be broken up into solvable steps, it is possible to translate it into actual reality. This is because you have broken the task down into simpler component steps and are now visualising each step with your position at each step being defined by the representative three coordinates at that point. Thus, the combination of breaking down the components of a task into contiguous segments will facilitate the completion of the complex endeavour that you are undertaking.

However, we always forget the fourth dimension, that is time. If two friends have to meet at a point on a road, the definition of the space that you are supposed to reach based on the three coordinates is not enough. You also have to define the time at which you are likely to meet. If you want to meet at one point and yet you do not define the time, then you will both reach the same point, but at diLerent times, and not meet each other. On the other hand, if you decide the time and you do not know the exact coordinates, you know when you will meet; however, you will never meet each other because you do not know where to reach.

Never forget this fourth dimension! The X, Y and Z coordinates should also be accompanied by the fourth dimension: time. Therefore, whenever there is a task in hand, some realistic self- imposed deadlines help you in reaching a higher level of motivation and also helps you in completing your work. By including the fourth dimension of the deadline of time, even if the work does not get completed in the allotted time, it has helped you divide the work into its time- dependent component parts, based on the self-imposed deadlines that you have created for yourself.

Even in the moments of intense grief, failures and disappointments, factoring in the fourth dimension, '*time'*, helps you decrease the intensity of the reaction by spreading it over quanta of time. We have all often heard the statement "...and this too shall pass away."

The joining of coordinates of components of the task in focus with self-imposed deadlines of time really helps in the completion of the task that you have assigned for yourself.

The Third Lesson comes from a recent and Novel Discovery in Neuroscience and Medicine

The Changing Electrical Pulses of one Neuron

A neuron is a nerve cell that transfers electrical signals from one area of the brain to the other. Dendrites are branch-like extensions of a neuron whose job is to collect information from other neurons and to pass them to the body of the neuron, that further transmits the nerve impulse responsible for a coordinated action.

Normally these signals are regarded as an 'all or none" phenomenon and fire at a constant rate and frequency. However, very recently, new electrical signals have been detected between dendrites, known

as ‘calcium mediated dentritic action potentials (dCaAPs)’. These signals show a graded response; *they reach a peak at just the right level of input but become weaker with stronger inputs.*

This has several implications. Why does even an elderly person with a fading memory, or a very busy person who is constantly forgetting things, not forget the long-term relationships? Why does a seemingly formidable task appear relatively easier the more number of times you repeat it? And why, in times of personal stress and intense anxiety or anger, the ability to think straight and make prudent judgements disappears?

Perhaps the graded response of neuronal signals becomes established into well-defined patterns of electrical impulses in the brain. The longer you know someone, the more established this memory becomes. Despite the degrees of diLiculty the seemingly super-human task appears to oLer, the more number of times you address it and repeatedly practice it, the easier it seems to become, due to these established memory patterns in the brain. We have all heard the saying, ‘‘A genius is 99% perspiration and 1% inspiration’’.

Remember another aspect of the graded electrical signals of neurons; they become weaker with stronger inputs of the neuron but remain at a peak with an optimum input. The extremely strong inputs of anxiety and stress, therefore, weaken, the focused signals.

In times of stress, repeatedly training yourself by constant practicing the diLicult task over time helps you to think logically as well as coherently and also helps to suppress your strong emotional responses like anger and anxiety. Thus, anyone engaged in a stressful task, for example a pilot, soldier, Olympic athlete or a specialised surgeon, constantly practices and gathers experience. How do they control their anxiety and stress? By repeating and constantly visualising the stressful situation, they train themselves, so that when they finally encounter the visualised situation in real life, they have already rehearsed their reaction to it. Thus, they can utilise their internal stress to optimise their performance.

In biological terms, they are aligning their neuronal electrical impulses to an optimum firing. An optimum and an aligned electrical signal is ensured by constantly training oneself and by gaining valuable experience. This endeavour of constantly training and gaining valuable experience prevents the strong signals from emotive thoughts like anger and anxiety from emerging, as well as from suppressing the steady stream of task-oriented impulses. The consequence is that the optimised peak electrical signals to pursue a thought or an activity eLectively align themselves in the direction of positive action and are not suppressed.

Constantly training oneself, performing the recurrent visualisation of an anticipated stressful situation, and continually striving to gain valuable experience, align individuals to the task in hand, without allowing the negative influences of anger or anxiety to cloud their judgement.

Notional Concept of a University

I ask a strange question? What is Sri Ramachandra Institute of Higher Education and Research? What does it represent? Does it represent the beautiful campus that you have? Is it the set of buildings located in the campus? Is it the intelligent set of students inhabiting its colleges? Or is it the fraternity of faculty and staL members striving hard to maintain the exacting academic standards in teaching, training and research. Actually, in essence, the answer is both ‘‘all of the above’’ and ‘‘none of the above.’’ It is undeniable that all the groups mentioned above constitute an integral part of your institute’s fabric; however, none of them actually represents it in entirety, in its fundamental form. Let me qualify my statement.

Actually, Sri Ramachandra Institute of Higher Education and Research is a notional concept deeply engrained in the minds of every individual working here. Without this all-pervading fundamental thought that all of you belong to this revered institute, having personally resolved to follow its rules, regulations and precedence, as well as to carry its name forward to the best of your ability, this place loses its academic significance and notionally deteriorates into a conglomerate of irrelevant civil construction or crowds of people. Thus, the deeply engrained thought that this is your institute whose name you will represent throughout your lives, in whatever endeavours you undertake, and in every thought, word and deed, is the over-riding factor that decides the success of your institute. You must never let go of this deep all- encompassing bond that you have notionally and subconsciously established with your institute. This firm belief actually is and will be responsible for your eminence as well as that of your institute.

I wish all of you my very best wishes for your future. ❑

Faculty Development Programme on AI and MOOCs in the Evolution of Digital Pedagogy

A six-day Faculty Development Programme on *'*AI and MOOCs in the Evolution of Digital Pedagogy for *Viksit Bharat*@2047' was organised by the Faculty Development Centre, Sri Dev Suman Uttarakhand University from August 11–16, 2025. The programme brought together distinguished resource persons from leading universities, central institutions, and research organisations across India. The event witnessed enthusiastic participation from faculty members, research scholars, and academic practitioners across disciplines and regions, making it a vibrant platform for the exchange of ideas and collaborative learning.

The Chief Guest, Prof. N K Joshi, Vice Chancellor, Sri Dev Suman Uttarakhand University, delivered the keynote address. He underscored that technological innovation, coupled with academic excellence, is the cornerstone for India's future in higher education. He pointed out that Artificial Intelligence and MOOCs are not merely supporting tools but critical enablers in shaping an inclusive, globally competitive, and learner-centric academic ecosystem. His words set the vision and tone for the entire programme.

Prof. Anita Tomar, Director, Faculty Development Centre, extended a warm welcome to all participants and speakers. She stressed that Indian higher education stands at a transformative crossroads, where the convergence of innovation, technology, and pedagogy will determine the future of academic excellence. She described the Faculty Development Programme as a comprehensive academic experience designed to equip teachers with AI-powered teaching and research tools, strategies for integrating MOOCs into the curriculum, and an understanding of how generative AI and deep learning can redefine digital pedagogy. She highlighted that the event would enable teachers to design inclusive and future-ready learning environments in line with NEP-2020.

The programme structure was introduced by the Coordinator, Dr. Atal Bihari Tripathi, who explained the sequence of expert-led sessions, while Dr. Seema Baniwal, Co-coordinator, proposed the vote of thanks. The inaugural ceremony concluded with the National Anthem, marking the beginning of a rich academic journey.

Prof. Pushpender Kumar, University of Delhi, delivered the inaugural lecture on 'AI Tools for Research and Teaching'. He introduced participants to practical AI applications for research assistance, data analysis, academic writing, and the development of learner-centric content. The focus was on tools that could directly enhance both teaching quality and research productivity.

Dr. Deivam, HNBG University, New Tehri, spoke on 'Digital Pedagogy and AI in Education'. He emphasised the capacity of AI to support adaptive learning models, personalised teaching, and flexible classroom strategies. He demonstrated real-world examples where AI-driven analytics help educators tailor teaching to diverse student needs.

The session on 'Natural Language Processing in Education' was handled by Prof. Mamta Rani, Central University of Rajasthan. She offered participants a glimpse into the world of NLP applications, ranging from automated essay scoring and intelligent tutoring systems to advanced language learning tools. The session illustrated how language technologies are bridging communication gaps and making education more interactive.

During his session, Dr. Atal Bihari Tripathi, Sri Dev Suman Uttarakhand University, spoke on the theme 'MOOCs Integration Strategies*'*. He discussed how online platforms can complement classroom teaching by ensuring flexibility, inclusivity, and scalability. He emphasised how MOOCs can bring world-class resources to local classrooms and enable blended learning. This was followed by an in-depth lecture on 'Neural Networks and Deep Learning' by Dr. Ajay, Central University of Rajasthan, who explained the working of deep learning algorithms and their applications in image processing, speech recognition, and education technology. Participants gained clarity on how machine learning underpins many of today's AI-driven tools. The next session, 'Foundations of the Internet and AI in Teaching' by Dr. Krishna Kumar Mihbey, Central University of Rajasthan, explained the architecture of the internet, web browsers, and

connectivity frameworks that enable MOOCs and AI tools to function effectively. The final session, 'AI Meets MOOCs' by Dr. Divya Srivastava, AIRDL, Ajmer, presented case studies on how the integration of AI into MOOCs can personalise content, enhance learner engagement, and support adaptive delivery.

The next day of the event was more hands-on and application-driven. Dr. G Jaculine Priya, LIBA, Chennai, delivered the session on 'AI Tools and Prompt Engineering'. The session provided participants with practical skills in designing effective prompts for generative AI systems. She showed how carefully crafted inputs can yield precise, useful, and context-specific outputs in teaching and research. The next session on 'Internet of Things (IoT*)* 'was delivered by Dr. Gaurav Meena, Central University of Rajasthan. He highlighted how IoT-enabled campuses can create smart learning environments with connected classrooms, real-time data monitoring, and intelligent learning systems. Another session on 'AI Innovations in Academia and Research' by Prof. Shikha Gupta, Chandigarh University, showcased examples of how AI is being deployed in institutional decision-making, plagiarism detection, research analytics, and smart libraries. Finally, the session by Dr Divya Srivastava, titled 'Craft, Curate, Captivate: AI Tools Every Educator Should Know', presented a toolkit of everyday AI applications, including lesson planning aids, automated assessments, and interactive teaching platforms.

The session by Dr. Niradhar, Indira Gandhi National Open University on 'NEP-2020 in Digital Education and SWAYAM and its Framework' mapped how government initiatives are promoting inclusive education. He elaborated on the structure of SWAYAM as India's flagship MOOCs platform and the role of educators in developing high-quality online courses. This was followed by the session on 'AI and MOOCs: Redefining Digital Pedagogy for the Future' by Prof. Praveen Kumar Shukla, Babu Banarasi Das University, Lucknow, who stressed how AI can act as a bridge between traditional pedagogy and digital delivery. The last session, 'Generative AI Tools and Techniques' by Prof. Sumathi S., St. Joseph's College, Chennai, highlighted the creative power of generative AI in content development, curriculum design, and learner engagement.

Dr. K Thiyagu, Central University of Karnataka, delivered the session on 'AI Tools for Education and Learner-Centred Content Development' and encouraged participants to adopt learner-centric approaches and use AI tools to make content more engaging. It was followed by two practical sessions by Dr. Niradhar, IGNOU, on 'Structuring Online Modules for MOOCs and Exploring MOOCs Design through SWAYAM*'*. Those provided participants with a hands-on roadmap for designing, structuring, and implementing MOOCs effectively.

The Programme concluded with the event report presentation and valedictory session, where participants expressed how the sessions had broadened their horizons. In her concluding remarks, Prof. Anita Tomar, Director of the Programme, emphasised that the Faculty Development Programme not only strengthened teaching and research skills but also encouraged educators to reimagine their role in a technology-driven academic landscape. It provided participants with a rare combination of theoretical insights, practical training, and policy direction. The sessions inspired educators to integrate AI and MOOCs into their teaching, research, and institutional practices, making them active contributors to the national mission of transforming Indian higher education by 2047.

National Workshop on Artificial Intelligence in Academia

The one-week National Workshop on **'**Artificial Intelligence in Academia: Bridging Disciplines for Improved Learning and Research' is being organised by the Mahila Mahavidyalaya, Banaras Hindu University, Varanasi, Uttar Pradesh from December 08-14, 2025. The event aims to bring together postgraduate students, research scholars, and faculty from varied fields to explore how AI can transform education and research. It will highlight AI's ability to transform teaching methods, speed up research, personalise learning, and support effective visual communication.

In today's rapidly evolving digital landscape, Artificial Intelligence (AI) is no longer a futuristic concept but a vital tool reshaping research, teaching, and learning across all academic disciplines. AI is fundamentally changing how we approach scholarly work. It offers solutions that enhance efficiency, creativity, and the quality of academic output. For researchers, AI tools can automate time-consuming tasks like literature reviews, data analysis, and citation management, allowing for more focus

on critical thinking and discovery. For educators, AI can personalise learning experiences, create dynamic teaching materials, and provide valuable insights into student progress. The Key Themes of the event are:

- Fundamentals of Python.
- Introduction to AI in Teaching, Learning, and Research & Understanding the Prompt Engineering.
- Generative AI for Digital Content Creation.
- AI for Classroom Teaching, Student Engagement, and Assessment.
- AI Tools for Personalised and Adaptive Learning.
- AI for Academic Writing, Editing, and Citation Management.
- AI-Assisted Literature Review and Knowledge Organisation.
- Plagiarism Detection, Data Privacy, and Academic Integrity with AI.
- Ethical and Responsible Use of AI in Academia.
- AI for Interdisciplinary Applications across Sciences, Social Sciences, and Humanities.
- AI for Research Productivity and Future Directions in Academic Research.

For further details, contact the Convener, Dr. Moumita Das, Mahila Mahavidyalaya, Banaras Hindu University, Varanasi-221005, Uttar Pradesh, Mobile No: 09083975918, E-mail: *ai.workshop.mmvbhu@gmail.com*. For updates, log on to: *www.bhu.ac.in/events/*

International Conference on Embracing Diversity, Equity, and Inclusivity

A three-day International Conference on 'Embracing Diversity, Equity, and Inclusivity in the Tourism and Hospitality Sector: *Viksit Bharat*@2047' is being organised by the Department of Tourism and Hospitality Management, Mizoram University, Aizawl, Mizoram from November 19-21, 2025 through hybrid mode. The event aims to bring together a dynamic mix of stakeholders, academicians, researchers, policymakers, entrepreneurs, industry professionals, students, and community leaders to collectively explore pathways for embedding Diversity, Equity, and Inclusivity (DEI) in tourism and hospitality. It will serve as a platform to exchange research insights, share best practices, and engage in meaningful dialogues around responsible tourism, inclusive growth, and technological innovation.

India is on a transformative journey toward becoming a fully developed nation by 2047 its centenary year of independence, under the ambitious Vision of *Viksit Bharat*@2047. As part of this national aspiration, the tourism and hospitality sector plays a crucial role not only in economic growth but also in shaping inclusive and sustainable development. A special emphasis will be placed on the Northeast region of India, a region celebrated for its cultural richness, ecological diversity, and strategic potential as a tourism hub. Recognised by the Hon'ble Prime Minister of India as the 'A*shtalakshmi*' of India, the Northeast is fast emerging as a model for community-led and sustainable tourism initiatives, supported by robust government investments and policy frameworks. The Themes of the event are:

Social Equity, Inclusivity, and Sustainability

Community-based Tourism, Rural Tourism, Agritourism, Responsible Tourism, Social Tourism, Vocal for Local, Local to Global, Cultural Tourism, Inclusive Tourism, etc.

Economic Equity and Local Empowerment

Job Creation, Skill Development, Tourism Entrepreneurship, Tourism Infrastructure, Community Entrepreneurship, Rural Entrepreneurship, Indigenous Handicrafts, Traditional Skills and Practices, One District One Product, One State One International Standard Destination, etc.

Environmental Diversity in Tourism

Biodiversity Conservation, Ecotourism, Nature-Based Tourism, Wetlands and River-Based Tourism, Coastal and Marine Tourism, Urban Green Tourism, Green Investment, Green Practices, Eco-friendly Infrastructure, Eco-friendly Accommodation, Eco-friendly Transportation, Responsible Tourism Practices, etc.

Technological Integration and Innovation

Leveraging Digitalisation, Social Media, Digital Marketing, Artificial Intelligence (AI), Virtual Reality (VR), Augmented Reality (AR), Blockchain, Robotics, Metaverse in Tourism, Sustainable Technology, Environmental Technologies, etc.

Integration of Indigenous Practices

Indian Knowledge System (IKS), AYUSH, Yoga & Meditation, Traditional Medicine, Health Tourism, Community-led and owned Tourism, Eco-spiritual and Nature-based Indigenous Tourism,

Cultural Exchange and Inter-Cultural Dialogue, Storytelling and Oral History in Tourism, etc.

Tourist/Service Provider Perspectives

Tourist Satisfaction, Guest Delight, Tourist Awareness and Responsible Behaviour, Public-Private Partnership in Tourism, Consumerism, Crisis Management and Emergency Coordination, Human Resource Development and Capacity Building, etc.

Policy/ Planning/ Guidelines

Policy Reforms, Guidelines, Innovative Approaches, Policy and Legal Frameworks Supporting Tourism, Stakeholder Engagement and Participatory Planning, Tourism-zoning and Land Use Management, Regulation and Licensing of Tourism Enterprises, Marketing, Branding and Destination Management.

For further details, contact the Convener and Head, Prof. Himanshu Bhusan Rout, Department of Tourism and Hospitality Management, Mizoram University, Aizawl, Mizoram – 796 004, Mobile No: 06370142229, E-mail: *tourism@mzu.edu.in.* For updaters, log on to: *www.mzu.edu.in/events/*

International Conference on Advances in Sustainable Research

A three-day International Conference on 'Advances in Sustainable Research for Energy and Environmental Management (ASREEM 2.0)' is being organised by the Department of Chemical Engineering, Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat from February 06-08, 2026. The tracks of the event are:

Track 1

- Wastewater Treatment Technologies and Recycling/Reuse and Resource Recovery.
- Membrane Technology and Advancement.
- Industrial Waste Management and Sustainable Practices.
- Advances towards Bioelectrochemical Systems.
- Renewable Energy, Management Systems for Energy Storage and Supply.
- Water-Energy Nexus.

Track 2

- Nanotechnology for Energy Conservation and Effective Utilisation.
- Advanced Materials and 3D Printing.
- Advanced oxidation processes and Sonochemistry: Emerging contaminants.
- Biosensors and Green Synthesis Using Biotechnology and Biocatalysts.

Track 3

- Thermochemical and Hydrothermal Techniques for Biomass Conversion.
- Plastics/Polymers and Biodegradable Polymers, Micro & Nano Plastics: Need and Challenges.
- Biotechnology: Algae-based Treatment, Bio-energy Production.
- Innovative Technologies and Solutions.

Track 4

- Advanced Solid Waste Management Strategies.
- E-Waste and Hazardous Waste Management.
- Waste-to-Energy Concept.
- Digitalisation and Traceability: Blockchain, IoT, and AI to Track Plastic Materials.

Track 5

- Sustainable and Green Chemistry.
- Oil Spills and Biodiversity.
- Refining and Petrochemicals.
- Catalysis and Reaction Engineering towards product formation.
- Air Pollution Management, Control, and Sustainability.
- Fuel Cells and Sustainability.

Track 6

- Modelling and Simulation, Computational Fluid Dynamics.
- Process Intensification.
- Sustainable Resource Management (LCA, TEA, Sustainable Supply Chains, etc.).
- Artificial Intelligence, Artificial Neural Network & Machine Learning.

Track 7

- Sustainable Development Goals.
- Entrepreneurship and Management for Environmental Remediation.
- Climate change and the Concept of Smart Cities.
- Environmental Policy and Regulation.

For further details, contact the Chairman, Department of Chemical Engineering, Sardar Vallabhbhai National Institute of Technology, Surat- 395007, Gujarat. Mobile No: 09904173019, 08287505262 and 08999254795. For updates, log on to: *www.asreem.in* ❑

THESES OF THE MONTH

HUMANITIES

A List of doctoral theses accepted by Indian Universities
(Notifications received in AIU during the month of Aug-Sep, 2025)

Cultural Studies

1. Chera Devi. **A comparative study of Bangru (Nyishi) and Miji folk narratives and social customs**. (Prof. Jumyir Basar), School of Humanities, Rajiv Gandhi University, Itanagar.
2. Sarma, Manish. **Representations of the change in popular culture in media texts: A study of select Bengali magazines**. (Dr. Madhumita Chakrabarty), Faculty of Liberal Arts, The ICFAI University, Tripura.

Geography

1. Singh, Nitish Kumar. **Impact of land-climate interactions on desertification of Rajasthan: A geographical appraisal**. (Prof. Vijay Kumar Barik and Prof. M S Nathawat), School of Sciences, Indira Gandhi National Open University, New Delhi.

History

1. Hassan, Rehana. **Role of international agencies in rebuilding social institutions of Tajikistan (1991-2010)**. (Dr. Darakhshan Abdullah), Centre of Central Asian Studies, University of Kashmir, Srinagar.
2. Lone, Ramees Ahmad. **Trade relations between India and Central Asia: A study of major North Indian Merchant Communities (1650-1750)**. (Dr. Darakshan Abdullah), Centre of Central Asian Studies, University of Kashmir, Srinagar.
3. Yogi, Yamini. **Chanderi Puratatv sangrehlaya mein sangrehit vaishnav pratimaye: Ek vivechnatamak adhyayan**. (Prof. Nagesh Dubey and Dr. Surendra Kumar Yadav), Department of Ancient Indian History Culture & Archaeology, Dr Harisingh Gour Vishwavidyalaya, Sagar.

LANGUAGES & LITERATURE

English

1. Awana, Arun Singh. **Outcasting caste: An analysis of Ambedkar's influence on selected dalit writings**. (Prof. Pramod Kumar), School of Humanities, Indira Gandhi National Open University, New Delhi.
2. Ayad, Abdulameer Hasan. **Exploring and analyzing the American dream in the select 21st century fiction**. (Dr. Rucha Brahmbhatt), Department of English, Gujarat University, Ahmedabad.
3. Barjo, Nirmal. **Stigma as social deviance and psychological dysfunction in select American novels**. (Prof. Bhagabat Nayak), Department of English, Rajiv Gandhi University, Itanagar.
4. Francis, Nitasha. **Gender based violence in black literature: Special reference to selected works of Alice Walker and Sefi Atta**. (Dr. Suresh Kumar), Department of English, Bhagwant University, Ajmer.
5. Goyal, Shilpi. **Jurgen Habermas's Theory of communicative action and the works of Charles Olson: A study in symbiosis**. (Dr. Manjinder Kaur Wratch), Department of English, Maharishi Markandeshwar (Deemed to be University), Ambala.
6. Jariwala, Denishkumar Harshadkumar. **A socio-psychological agony of LGBTQs in modern Indian society: A study of selected literary texts**. (Dr. Seema R Gida), Department of English, Saurashtra University, Rajkot.
7. Malik, Garima. **Trauma and psychic healing: A study of Twin Bombings in select Japanese literature**. (Prof. Ashok Verma), Department of English, Bhagat Phool Singh Mahila Vishwavidyalaya, Khanpur Kalan.
8. Manjunatha, G P. **Colonial law and social reformation in India: A study of select colonial novels**. (Dr. Veena M K), Department of English, Kuvempu University, Shankaraghatta.
9. Marwein, David. **A study of characters in selected Khasi folk narratives**. (Prof. Pema Eden), School of Humanities, Indira Gandhi National Open University, New Delhi.
10. Sandhu, Devendar. **Social psychological perspectives in selected novels of Suzanne Collins and Veronica Roth**. (Prof. Nandini Sahu), School of Humanities, Indira Gandhi National Open University, New Delhi.
11. Saraswathi, K. **Anthropocene and post apocalyptic survival challenges in select CLI-FI Works.** (Dr. T. Anantha Vijayah), Department of English, The Gandhigram Rural Institute, Gandhigram, Dindigul, Tamil Nadu.

12. Satapathy, Meghamala. **A study on ecospirituality in Mamang Dai's fiction**. (Dr. Ipsita Nayak), KIIT Department of Humanities, Kalinga Institute of Industrial Technology, Bhubaneswar.

13. Suman Lata. **A critical study on VS Naipaul novels and their cultural hybridity**. (Dr. Suresh Kumar), Department of English, Bhagwant University, Ajmer.

14. Vats, Priyanka. **Black feminist poetics: A study of the writings of Maya Angelou**. (Dr. Gayatri Kumari), Department of English, Maharishi Markandeshwar (Deemed to be University), Ambala.

15. Yadav, Annu. **Master-disciple relationship in the autobiographies of Himalayan masters**. (Prof. Nikhilesh Yadav), Department of English, Indira Gandhi University, Meerpur.

16. Yousuf, Masrat. **The aesthetics of tragic vision: A study of John Keats and Asraul Haq Majaz**. (Dr. Mohammad Ameen Parray), Department of English, University of Kashmir, Srinagar.

Gujarati

1. Gohil, Alpaben Bhupendrasinh. **A critical study of the contemporary Gujarati short stories with special reference to Ajit Thakor, Bipin Patel, Anil Vyas, Kirit Dudhat, Navneet Jani**. (Dr. Bharat Pandya), Department of Gujarati, M S University of Baroda, Vadodara.

2. Rathod, Digvijaysinh Laxmansinh. **A critical study of the selected novels with special reference to the relationship of history and novel**. (Prof. Bharat Mehta), Department of Gujarati, M S University of Baroda, Vadodara.

Hindi

1. Damor, Sanjaykumar Parvatbhai. **Maitreyi Pushpa ke katha sahitye mein aadivasi lokjeevan: Ek samikshanatamak adhyayan**. (Dr. Y K Goswami), Department of Hindi, Saurashtra University, Rajkot.

2. Damor, Sureshkumar Nansing. **Jaishankar Prasad ke upanyas aur natakoan ke patroan ka tulnatamak adhyayan**. (Dr. M G Gandhi), Faculty of Arts, Saurashtra University, Rajkot.

3. Jain, Pinky. **Kedarnath Singh kee kavita: Samvedna aur shilp**. (Prof. M Jha), Department of Hindi, University of North Bengal, Darjeeling.

4. Jha, Chaturanan. **Samkaleen Bhartiya yatharh aur Akhilesh ka katha-sahitya**. (Prof. Sunil Kumar Dwivedi), Department of Hindi, University of North Bengal, Darjeeling.

5. Natvar, Sampat Tadvi. **Premchand ke sahitye mein dalit nari ke vividh rupoan ka adhyayan**. (Dr. Hemlata S Kanchankar), Department of Hindi, Dr Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

6. Patel, Kalabahen Ishavarbhai. **Himanshu Joshi ke katha sahitye mein vyakat vichardhara**. (Dr. Pransinsinh R Chauhan), Department of Hindi, Saurashtra University, Rajkot.

7. Sharma, Nagendra Kumar. **Sanjeev kee kahaniyoan mein samajik chetna: Ek adhyayan**. (Prof. Daksha Mistry), Department of Hindi, M S University of Baroda, Vadodara.

8. Singh, Priyanka. **Reetikaleen sahitya mein istri jeevan ke vividh aayam: Ek vishleshanparak adhyayan**. (Dr. Moti Lal), Department of Hindi, Rajiv Gandhi University, Itanagar.

9. Singh, Virendra Kumar. **Swatantryottar grameen jeevan kee samasyan aur Vivekee Ray ke upanyas: Ek adhyayan**. (Prof. Daksha Mistry), Department of Hindi, M S University of Baroda, Vadodara.

Linguistics

1. Jebur, Ammar Kareem. **The effect of using process-based approach on developing English reading skills for Iraqi intermediate learners**. (Dr. Jagdish Joshi), Department of Linguistics, Gujarat University, Ahmedabad.

Sanskrit

1. Jana, Mantu Kumar. **Dhanapalapranitayah Tilakmanjarikathayah sahityikamadhayayanam, paravartikathaparamparayam tatprabhavascha**. (Prof. Bhagirathi Nanda), Department of Sahityam, Shri Lal Bahadur Shastri National Sanskrit University, New Delhi.

2. Kanaujia, Sanju. **Ambedkardarshanam Mahakavye ka samajik anusheelan**. (Dr. Ramhet Gautam), Department of Sanskrit, Dr Harisingh Gour Vishwavidyalaya, Sagar.

3. Kumawat, Parmeshwar Prasad. **Pandit Satyanrayana Shastri virchit "Shree Sanskrit Doha Saptshati" Evam "Sahitya Sudha Sohityam ka samikshanatamak adhyayan**. (Dr. Rajneesh Sharma), School of Arts and Humanities, Sangam University, Bhilwara.

4. Nayak, Tilottama. **Pandita-Sri Govinda-Chandra-Mishra-kritisu darsana-tattvanusilanam**. (Prof. Gaurpriya Dash), Department of Darshana, Central Sanskrit University, New Delhi.

5. Paul, Anjali. **Gita-Govinda Vaishnava-Padavalyoh tulanatamaka madhyayanam**. (Prof. Suryamani Rath), Department of Sahitya, Central Sanskrit University, New Delhi.

6. Rajesh Kumar. **Utarkalamritgranthoyaktv-isheynamadhuniksanadrbh paryogatamaka madhyayanam**. (Prof. Shyamdeo Mishra), Department of Jyotish, Central Sanskrit University, New Delhi.

7. Solanki, Mayuri Shashikant. **A study of semi deities in Bhagavatapurana from social and cultural perspective**. (Dr. M K Moliya), Department of Sanskrit, Saurashtra University, Rajkot.

8. Yogendra Kumar. **Mrignakshataka-nitisatakayoh-samaskritika-samajika sahitya- dristya samiksanatamakam adhyayanam**. (Dr. V S V Bhaskar Reddy), Department of Sahitya, Central Sanskrit University, New Delhi.

PERFORMING ARTS

Dance

1. Joshi, Gayatri Dhirajlal. **Importance of yoga's training for Kathak dancer: A study**. (Dr. Bhartiben Rathod), Faculty of Performing Arts, Saurashtra University, Rajkot.

2. Mody, Disha Roopang. **The use of Mudrā in Hindu & Yogic Traditions as also in Buddhist tantric rituals and Hasta in classical Indian dance-Bharata Nātyām: An analytical and comparative study with special reference to their depiction in Ancient Yogic-Tantric Treatise/Iconograph**. (Dr. Ami Dhaivat Pandya), Department of Dance, M S University of Baroda, Vadodara.

3. Thakkar, Vidhi Pragnesh. **Natyashastra tatha abhinaydarpan mein varnit angik abhinay Bharatanatyam nritya shaili ke vartaman swaroop ke sandarbh mein (Swatantrata ke pashchat): Ek adhyayan**. (Dr. Smruti Vaghela), Department of Dance, M S University of Baroda, Vadodara.

Drawing & Painting

1. Chhipa, Mohammad Wasim. **Paramparik Bhartiye Batik kala: Swaroop evam vikas: Bhairavgarh Ujjain ke vishesh sandarbh mein**. (Dr. Alpana Upadhyaya), Department of Drawing, Samrat Vikramaditya University, Ujjain.

2. Wadhwa, Vinny. **Madhya Pradesh ke chitrakala shikshan mein kala shikshakoan ka yogdan: Uchh shiksha ke sandarbh mein**. (Dr. Alpana Upadhyaya), Department of Drawing, Samrat Vikramaditya University, Ujjain.

Music

1. Rai, Karuna. **A study of traditional folk and devotional songs of Varanasi**. (Prof. Sangeeta Bapat), Department of Music, S.N.D.T. Women's University, Mumbai.

2. Shirale, Nitin. **A study of dissemination of Kathak dance in Malaysia through Indian Culture Center**. (Dr. Archana Parmar), Department of Music, Samrat Vikramaditya University, Ujjain.

Tabla

1. Solanki, Dipakkumar Umangbhai. **Tabla kee bandishoan mein nihit chhand: Ek samagralakshi adhyayan**. (Prof. Gaurang Bhavsar), Department of Tabla, M S University of Baroda, Vadodara.

Theatre and Television

1. Chauhan, Rakhi. **Study of theatrical elements in folk tradition an analytical study of Tesu Jhenjhi Sanjhi and Jhinjhiya**. (Prof. Govindaraju Bharadwaja), School of Performing and Visual Arts, Indira Gandhi National Open University, New Delhi.

Philosophy

1. Barman, Jayanta. **Putnam on internal realism: A critical reflection**. (Prof. K L Das), Department of Philosophy, University of North Bengal, Darjeeling.

2. Ghosh, Avhijit. **Wittgenstein on sense, nonsense and beyond**. (Prof. K L Das), Department of Philosophy, University of North Bengal, Darjeeling. ❑

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