

# REVIEWING ARCHITECTURAL DESIGN EDUCATION (ADE) IN INDIA: CURRICULUM ANALYSIS AND A PROPOSED COMPETENCY ASSESSMENT FRAMEWORK

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## ABSTRACT

Architectural Design Education (ADE) in India has changed little over the past two decades and still relies on an outdated curriculum. As a result, students and graduates may be underprepared for real-world professional challenges. Previous research from Europe, the USA, India, Australia, and South Asia shows considerable variation in ADE curricula, which generally fall into two areas: art and design, and technical practice. This study examines the curricular focus of Indian and international universities, compares frameworks developed by Indian regulatory bodies such as COA and AICTE with those of NAAB, RIBA, and AIA, and evaluates how closely Indian university curricula align with these standards. By comparing five leading architecture schools in India with four international institutions, the study identifies both shared features and major differences. The findings show that Indian ADE emphasises foundational theory and design skills but pays less attention to emerging technologies and practical experience than international programs do. The study also reveals gaps between COA standards and their implementation. In response, it proposes a competency assessment framework to support curriculum standardisation, improve assessment efficiency, and promote consistency and accountability.

## KEYWORDS

**Architectural Design Education, comparative analysis, competency assessment framework, curriculum alignment, efficient assessment, regulatory bodies**

## HOW TO CITE

Jerome E., Maulik S. (2026) 'Reviewing Architectural Design Education (ADE) in India: Curriculum Analysis and a Proposed Competency Assessment Framework', *Journal on Efficiency and Responsibility in Education and Science*, vol. 19, no. 2, pp. 101–118. <http://dx.doi.org/10.7160/eriesj.2026.190201>

## Article history

**Received**

June 17, 2025

**Received in revised form**

March 19, 2026

**Accepted**

June 2, 2026

**Available on-line**

June 30, 2026

## Highlights

- Proposes a standardised competency assessment framework for undergraduate architecture education.
- Aims to reduce ambiguity in assessments among students, academics, and recruiters.
- Aims to enhance efficiency through streamlined and measurable assessment criteria.
- Promotes responsible and transparent educational evaluation practices..

## INTRODUCTION

The field of architecture evolves in response to socio-cultural, economic, and technological advancements, which require regular updates to curricula and competency lists (Şengül Erdoğan et al., 2021). Architectural Design Education (ADE) in India is governed by the Council of Architecture (COA), which enforces standards, regulates the curriculum and competency framework, and ensures quality education for students. Despite this, ADE in India faces significant challenges in balancing theory and practical skills (Bhattacharjee and Bose, 2015). In this study, ADE refers to the educational framework through

which architectural design knowledge (K), skills (S), attributes (A), and professional thinking are developed within architecture institutions through curriculum content, evaluation methods, and professional preparation.

## Education–practice divide in ADE

Early architecture schools in India placed strong emphasis on skill and craft development. However, they gradually evolved to follow the Vitruvius and Bauhaus models (Bhattacharjee and Bose, 2015; Jerome and Maulik, 2024). Even today, remnants of these international influences can be seen in the curriculum.

Although the architectural community continues to discuss whether the traditional educational model should change to better prepare students for the demands of practice, ADE in India has largely remained unchanged for an exceedingly long time (Jerome and Maulik, 2024). Since the 1960s, industry professionals and design faculty have strongly criticised the Bauhaus educational approach, which drew a clear distinction between theory and practice (Jerome and Maulik, 2024; Hejazi and Shafaei, 2020). The division of academic preparation into “education” and “practice training” is based on this distinction between theory and practical skills. Education gives students the tools to think critically, conduct research, and solve complex present and future problems, whereas training provides the technical and analogue skills required by the industry and facilitates employment opportunities (Frascara, 2020; Jerome and Maulik, 2024).

A review of previous research in India and elsewhere indicates substantial variation in ADE curricular focus, ranging from an art and design focus (core academic theory) to technical aspects and professional practice (Bhattacharjee and Bose, 2015). However, previous research does not clarify the extent of curricular change required to achieve standardisation and better prepare students for real-world practice. Articulating the anticipated extent of change is therefore an important first step, alongside the active involvement of students, practitioners, and academics (Corvalán et al., 2015). In addition, there is a mismatch between two key stakeholder groups—academics and practitioners—regarding the knowledge, skills, and attributes (KSAs) expected of architecture graduates by practitioners and those perceived to be acquired through academia (Hejazi and Shafaei, 2020; Shannon, 2012; Garg et al., 2022; Jerome and Maulik, 2024). This further confirms the gap between architectural education and professional practice, with both domains being viewed as separate entities by stakeholders.

### **ADE in the global and Indian context**

Architectural education faces global challenges. Many countries recognise that curricula and teaching methods are outdated and require revision (Lee, 2018; Maneshi et al., 2023; Soliman et al., 2019).

Key issues include:

- gaps between theory and practice (Corvalán et al., 2015; Maneshi et al., 2023; Soliman et al., 2019; Lee, 2018);
- disconnects between industry and academia (Maneshi et al., 2023; Soliman et al., 2019);
- undefined skill sets for professional practice (Maneshi et al., 2023; Soliman et al., 2019; Lee, 2018);
- inadequate practical training for students (Maroya et al., 2019; de Boissieu and Deutsch, 2022; Komnencic et al., 2016; Hejazi and Shafaei, 2020; Garg et al., 2022); and
- insufficient coverage of industry-relevant skills. Critical thinking and strategic analysis are essential academically, while practical skills such as entrepreneurship, budgeting, marketing, design production, business planning, technical knowledge, and communication are crucial for industry readiness (Bhattacharjee and Bose, 2015; Corvalán et al., 2015; Maneshi et al., 2023). Current curricula do not effectively cover these skills, which may leave students less prepared for the workforce (Maneshi et al., 2023; Soliman et al., 2019).

Architectural education in India expanded significantly in the early 20th century (Bongirwar and Das, 2022). The first organised architecture course began at Sir J. J. School of Art in Mumbai in 1913 and was influenced by European styles and traditional teaching methods (Bongirwar and Das, 2022). COA regulates the curriculum, combining theory, practical studies, and project work (Bhattacharjee and Bose, 2015). However, the insufficient integration of modern technologies and methodologies has been criticised (Bongirwar and Das, 2022; Naralasetty and Ugrani, 2023). Current challenges point to the need for reform, as outdated curricula and teaching methods do not adequately address rapid technological advancement (Pandit, 2019). Graduates are often underprepared for real-world employment and may later return as educators, raising concerns about the effectiveness of the education provided (Bhattacharjee and Bose, 2015; Chandavarkar, 2018). Moreover, the disconnect between academia and industry (Yamano and Iba, 2024) limits collaboration and creates a disparity between classroom-based skills and professional needs. Reforms should align programmes with international standards, enhance practical training, and encourage students to engage critically with current architectural challenges in order to develop creative problem-solving abilities (Chandavarkar, 2018).

### **Role of regulatory bodies in ADE: India vs. international context**

As Table 1 shows, the regions considered in the comparative analysis of regulatory bodies are the UK, the USA, India, and Australia.

COA is primarily responsible for overseeing architectural education in India by accrediting institutions, establishing curriculum frameworks, and certifying compliance with educational standards (Bhattacharjee and Bose, 2015; Bongirwar and Das, 2022). However, the rigid framework of COA and the All India Council for Technical Education (AICTE), which has remained largely unchanged since 1983, has been strongly criticised for its inability to keep pace with evolving industry needs and educational demands (Bhattacharjee and Bose, 2015; Chandavarkar, 2018). Conversely, global accreditation bodies such as Royal Institute of British Architects (RIBA) and National Architectural Accrediting Board (NAAB) use active approaches involving regular reviews, stakeholder engagement, and robust quality assurance mechanisms to ensure that programmes meet contemporary challenges (Bentley, 2013; Bhattacharjee and Bose, 2015). Unlike COA, these organisations prioritise multidisciplinary perspectives and technology integration, enabling a more effective response to global and industry demands (Bentley, 2013; Chandavarkar, 2018).

### **Role of technology in architectural education: India vs. global context**

Technology has a major influence on ADE in India and globally, although its integration and implementation vary. In India, technological integration is reported to be slow and inconsistent because of a heavy reliance on traditional teaching methods and regulatory frameworks that hinder rapid change

Accreditation Board	Region	Key Points	Curriculum Regulation
<b>Royal Institute of British Architects (RIBA)</b>	United Kingdom	<ul style="list-style-type: none"> <li>-Validates architecture programs through peer reviews.</li> <li>- Focuses on quality and student performance rather than credit hours.</li> <li>- Requires internal validation reports and external examiners' reports.</li> <li>- More flexible timelines and less paperwork compared to NAAB.</li> </ul>	Curriculum is informed by the Education General Criteria (EGC) without setting specific credit hour requirements, allowing flexibility while emphasizing design quality.
<b>National Architectural Accrediting Board (NAAB)</b>	United States	<ul style="list-style-type: none"> <li>- Accredits architecture programs leading to licensure in the USA.</li> <li>- Requires 150 credit hours with defined core areas, ensuring a structured approach to education.</li> <li>- Needs programs to submit a formal letter and a Plan for Achieving Initial Accreditation along with proof of institutional accreditation.</li> </ul>	Defines specific Student Performance Criteria (SPC) that programs must meet, ensuring that the curriculum aligns with required competencies and skills needed for practice.
<b>Council of Architecture (COA)</b>	India	<ul style="list-style-type: none"> <li>- Regulates architectural education standards in India.</li> <li>- Enforces curriculum standards and guidelines for architectural programs.</li> </ul>	Sets minimum requirements for curriculum structure, including courses in design, history, technology, and practical training, aligning with national education goals.
<b>Australian Institute of Architects (AIA)</b>	Australia	<ul style="list-style-type: none"> <li>- Sets criteria touching upon design studies, documentation, history, practice management, and communication skills for architects.</li> </ul>	Guidelines dictate the integration of the various key elements into the educational curriculum, ensuring that programs align with industry needs and standards.

**Table 1: Comparative analysis of global regulatory bodies in architecture**

(Pandit, 2019; Bongirwar and Das, 2022; Naralasetty and Ugrani, 2023). This variation affects students' preparedness for technology-driven jobs and, consequently, their employability. Globally, many architecture schools integrate technology into their curricula to enhance students' employability skills and adaptability to the professional world (Hammadamin and Nordin, 2024; Soliman et al., 2019). Regions such as North America, Europe, the Middle East, and South Asia have integrated technologies such as virtual reality (VR), augmented reality (AR), and advanced modelling techniques into ADE, creating dynamic learning environments (Bhattacharjee and Bose, 2015; Bentley, 2013). In contrast, emerging technology research in Indian architecture is recognised but limited by funding, resources (Bhattacharjee and Bose, 2015; Chandavarkar, 2018), and, more importantly, resistance to adopting new approaches. Global architecture schools extensively research technological integration and innovation in design (Bhattacharjee and Bose, 2015; Soliman et al., 2019). Overall, technological integration in ADE varies significantly between India and global institutions.

### Role of existing competency frameworks

Existing studies in art and design, engineering, and science education examine rubrics and competency frameworks (Lutnæs, 2018; Pop-Iliev and Platanitis, 2008; Allen and Tanner, 2006). Rubrics provide clear and organised frameworks for defining and evaluating competencies in education. However, in design education, skills such as creativity, collaboration, and critical thinking, although increasingly recognised as essential learning outcomes, often remain underrepresented (Lutnæs, 2018). Rubrics should make learning goals and evaluation criteria unambiguous for all stakeholders, including students, teachers, and

recruiters, thereby bridging the gap between expected and acquired competencies, especially in creative educational tasks (Allen and Tanner, 2006). In Norwegian art and crafts education, one study highlighted that rubrics were commonly used to assess craftsmanship and students' technical skills, emphasising competencies such as "developing techniques" and "crafting and improving" (Lutnæs, 2018). The rubric used was a flexible, non-linear, and open-ended framework that enabled evaluators to assess creativity in student performance by accommodating various interpretations and expressions in design education and by aligning with a disciplined, practice-based understanding of creativity.

Another relevant study by the Centre for Real-World Learning (CRL) developed the Creativity Wheel, which identifies five core creative tendencies: inquisitive, persistent, imaginative, collaborative, and disciplined. Each tendency includes sub-tendencies that frame creativity as an assessable competency (Pop-Iliev and Platanitis, 2008). The rubric uses a performance-level scale and functions as a structured assessment tool with defined performance criteria, allowing engineering students' design projects to be assessed systematically. Many educators face challenges in evaluating and assessing creativity. Creativity is often framed as an innate trait rather than a skill that can be developed, leading to vague or inaccurate assessment. In addition, an overemphasis on individual performance can overshadow the collaborative competencies that are crucial in real-world problem-solving. To address these challenges and gaps, a new, more holistic framework is needed to integrate the identified gaps and reduce ambiguity.

An exhaustive literature review identified multiple recurring research gaps. Across regions, the identified gaps emphasise four key aspects:

1. Disconnect between theoretical knowledge and practical application
2. Variation in curriculum content, depth, and focus
3. Ineffective assessment techniques
4. Lack of practical training or real-world experience

Taken together, these gaps highlight the need for a standardised curriculum framework that can benefit universities. A limited number of studies have been conducted in India to identify the gaps and difficulties in ADE and practice at the local, state, and national levels (Jerome and Maulik, 2024). Further research is therefore essential for addressing these challenges and developing a more effective and efficient ADE system that equips students with the knowledge, skills, and attributes needed to address the complex challenges facing the built environment in the 21st century.

Therefore, the main objective of this study is to identify and highlight the commonalities and differences in curriculum structures and competencies required by architecture graduates globally and within India, thereby contributing to a more efficient, standardised, and responsible approach to competency development and evaluation in architectural education.

## MATERIALS AND METHODS

The paper uses a comparative analysis method (as seen in Figure 1) to examine the ADE curricula across five premier architecture schools in India and four architecture schools globally, compare global regulatory bodies, and assess the alignment between architecture schools in India and the KSAs defined by the regulatory body in India.

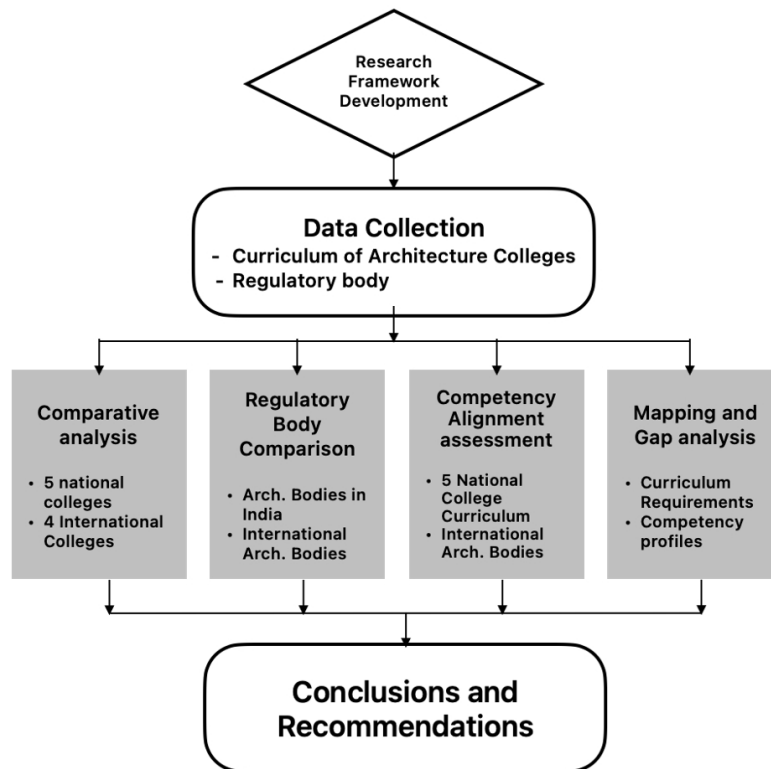


Figure 1: Research methodology framework

### Data analysis technique

The analysis was performed through three lenses: the curricular focus of Indian universities compared with that of international universities; the curriculum framework established by Indian regulatory bodies such as COA and AICTE compared with that of international regulatory bodies such as NAAB, RIBA, and AIA; and the alignment of curricular focus between universities and regulatory bodies in India.

The criteria for curriculum evaluation were identified as the breadth and depth of courses, the balance between theory and practice, integration across disciplines, curricular focus, course alignment with learning outcomes, and learning outcome alignment with competency. They are defined as follows:

- Breadth and depth of courses - the relationship between core and optional content, analysed through the subjects covered and the number of contact hours allocated.

- Balance between theory and practice - the extent to which the curriculum is dedicated to theoretical learning versus studio-based practical education and the engagement of practising professionals as instructors.
- Integration across disciplines - how well different fields, such as urbanism, construction, and the humanities, are integrated into architectural education to ensure a holistic learning experience.
- Curriculum focus - the main areas of emphasis within the educational programme and the extent to which the core concepts of architecture are prioritised and effectively conveyed across courses.
- Course alignment with learning outcomes - how individual courses are structured to meet specific educational objectives and how the content taught aligns with students' desired competencies.

- Learning outcome alignment with competency - how the defined learning outcomes correspond with the competencies expected from graduates and the extent to which the educational programme prepares students for professional practice.

The architecture schools in India were identified using the National Institutional Ranking Framework (NIRF) rankings of 2023 and included the Indian Institute of Technology (IIT) Roorkee, the School of Planning and Architecture (SPA) Delhi, Nirma University Ahmedabad, the National Institute of Technology (NIT) Calicut, and Kamla Raheja Vidyanidhi Institute for Architecture (KRVIA). The international architecture schools were identified based on the QS World University Rankings and consisted of the Bartlett School of Architecture at UCL, Massachusetts Institute of Technology (MIT), the National University of Singapore (NUS), and Royal Melbourne Institute of Technology (RMIT) Melbourne.

The analysis was conducted through a structured, multi-stage process designed to ensure systematic and fair interpretation

and comparability. The comparative analysis for each parameter was performed using the following process:

- Official curriculum and regulatory body documents from selected institutions and regulatory bodies were critically reviewed and summarised to extract key themes, concepts, and terminology relevant to architectural education.
- The key points were used to generate word clouds, enabling a visual representation of dominant curricular emphases.
- The frequency of individual terms within the word clouds was analysed to identify patterns and relative prominence across curricula.
- The observed word frequencies were mapped onto a Likert-scale framework, as shown in Table 2 (Shannon, 2012), to translate qualitative textual data into a comparable semi-quantitative measure. A frequency score of 5 indicates a dominant presence of repeated keywords, whereas a score of 1 refers to a very low presence of repeated keywords. Keywords and thematic categories were refined iteratively through repeated reading.

Frequency Score	Label	Frequency Pattern Description
5	Very High Frequency	Dominant presence of keywords ( $\geq 12$ occurrences) Multiple high-frequency clusters ( $\geq 10$ each). <b>Shows extremely strong emphasis in the dataset</b>
4	High Frequency	Key terms appear very frequently (8–11 occurrences). <b>Clear emphasis but not overwhelming</b>
3	Moderate Frequency	Medium-level presence (5–7 occurrences). <b>Balanced emphasis but not dominant</b>
2	Low Frequency	Infrequent appearance (2–4 occurrences). <b>Indicates presence but low emphasis</b>
1	Minimal Frequency	Very low appearance (1–2 occurrences). <b>Indicative of weak or negligible emphasis</b>

**Table 2: Frequency rating system (Likert Scale Explanation) (modified and adapted from Shannon, 2012)**

The final process for developing the proposed framework was structured to ensure clarity and consistency in competency identification and evaluation. The use of standardised indicators improves reproducibility and reduces evaluator subjectivity, thereby contributing to more responsible assessment practices.

## RESULTS

This section highlights key insights from previous literature, compares the curricula of premier architecture schools in India and globally, and compares these curricula with global architecture regulatory bodies. In addition, it examines the alignment between Indian architecture schools and the graduate competencies—knowledge, skills, and attributes—defined by COA.

### Comparison between Indian and international architecture schools

Analysis of the curricula from the Bartlett School of Architecture, MIT, RMIT, and the National University of Singapore (NUS) highlights their shared focus on integrating theory and practice, while each institution adapts this focus to its own goals and principles. Bartlett blends creative exploration with technical precision through studios and technical modules, strongly emphasising spatial dynamics, sustainability, and user experience. MIT implements an interdisciplinary approach, combining design, theory, computation, and environmental systems to address global

issues, with a focus on innovation and technical mastery. RMIT adopts a design-led model with projects emphasising urbanism, sustainability, and problem-solving in civic and urban design, while electives enhance digital fluency. NUS focuses on tropical, sustainable, and systems-oriented design, integrating urbanism and computational proficiency in scale-sensitive studio projects.

Architecture schools in India show varied curriculum structures that reflect distinct thematic priorities and strengths. SPA Delhi emphasises sustainability and interdisciplinary learning, offering professional training, hands-on studio work, and elective clusters ranging from smart cities to biomimicry. NIT Calicut integrates technology and sustainability through construction labs, workshops, and electives such as architectural journalism and smart cities. IIT Roorkee combines technical and computational design knowledge with real-world exposure through internships and innovative courses such as industrialised construction and housing. Nirma University focuses on urban planning, heritage, and applied research alongside field studios and law and management collaborations. KRVIA adopts a regional and critical design approach, promoting iterative processes and electives rooted in urbanism, society, and sustainability (Modabber Dabagh, 2019; Dupre, 2021). Key gaps include inconsistent integration of theory and practice, uneven flexibility in academic pathways, and limited embedding of BIM and AI into core modules. Although sustainability features prominently, its application lacks depth in hands-

on projects. Digital tools are offered as electives rather than core learning, leading to gaps in universal digital literacy. Professional readiness also varies significantly, with some schools emphasising conceptual development (KRVIA) and others focusing on industry alignment (NIT Calicut, IIT Roorkee). Entrepreneurial exposure and structured networking remain underdeveloped. Similarly, the balance between global and local trends is inconsistent: SPA Delhi and KRVIA prioritise vernacular architecture, whereas others focus on digital transformation (Dupre, 2021). This section compares curriculum frameworks across Indian

and international architecture schools by summarising official institutional documents to identify key themes relevant to architectural education. These points were used to create word clouds that visually emphasise the main curricular highlights, as shown in Figure 6 in the Appendix. Analysis of term frequencies within these clouds revealed patterns and relative importance across curricula. These frequencies were then mapped onto a Likert scale, translating qualitative textual data into a semi-quantitative measure for easier comparison, as shown in Table 3. The Likert-scale rating emphasises thematic prominence.

Aspect	International Schools	Indian Schools	Reason
Balance between Theory and Practice	5 Seamless integration in design studios and real-world challenges.	5 Strong through internships, working drawings, and thesis; more formalized.	Both strong. Internationals use real-world challenges in studios; Indian schools formalize through internships.
Curriculum Focus	5 Innovation, sustainability, global-local integration, cultural depth.	4 Technical grounding with emphasis on sustainability, urbanism, and regional relevance.	Internationals focus on innovation/global-local themes; Indian schools lean more technical and regional.
Courses	4 Well-rounded mix: design, theory, environmental systems, computation.	3 Studio-led with technical, structural, and environmental emphasis; often semester-wise split.	Both include design and technical courses, but internationals offer broader and integrated approaches.
Integration across disciplines	5 Highly interdisciplinary links to computation, science, urban planning.	3 Integrated through electives in law, planning, management, and humanities.	International schools are highly interdisciplinary; Indian ones integrate via electives but to a lesser degree.
Course Alignment to Learning Outcomes	5 Strong focus on global awareness, design mastery, sustainability, and innovation.	3 Well-structured outcomes emphasizing professional preparedness and digital proficiency.	International programs are globally outcome-driven; Indian ones well-structured, more practice-oriented.
Learning Outcomes Alignment to Competencies	4 Emphasizes cultural insight, ethics, sustainability, and technical excellence.	3 Focus on design skills, technical adaptability, analytical thinking, and societal impact.	International: ethics + sustainability + culture. Indian: strong technical/design focus with societal impact.

**Table 3: Comparative analysis of national and international architecture schools based on curriculum frameworks**

Table 3 shows that international architecture schools score slightly higher across all parameters, including the balance between theory and practice, curricular focus, integration across disciplines, course alignment with learning outcomes, and learning outcome alignment with competencies. National architecture schools display a strong grounding in students' professional preparedness but lag somewhat in aligning courses with learning outcomes and competencies, even as they attempt to maintain a strong balance between theory and practice (All India Council for Technical Education, 2019; Council of Architecture, 2023). Among international colleges, Bartlett emphasises creative context (University

College London, n.d.), MIT leads with innovation (Massachusetts Institute of Technology, n.d.), RMIT provides hands-on realism (Royal Melbourne Institute of Technology, n.d.), and NUS prioritises sustainable solutions grounded in systems thinking (National University of Singapore, n.d.). In contrast, Indian architecture schools show diverse strengths but face challenges in standardising frameworks for global benchmarking, integrating advanced technology, and balancing cultural identity with global innovation. The radar chart (Figure 2) visually represents the comparison between the curriculum frameworks of international and national architecture schools.

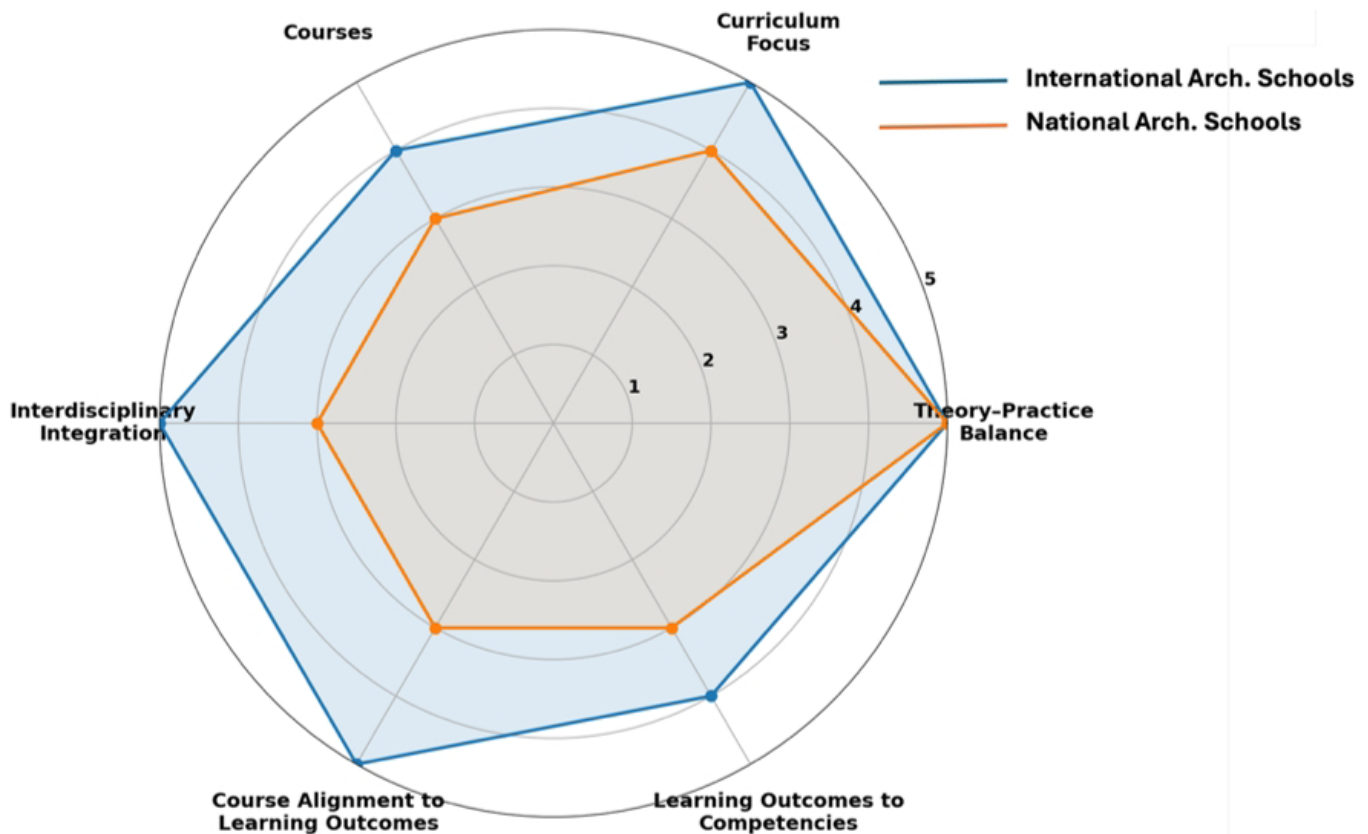


Figure 2: Comparison of curricula across Indian and international architecture schools

### Comparative analysis of global regulatory bodies

The comparative analysis of regulatory bodies worldwide evaluated parameters such as theory–practice balance, curricular focus, core components, learning outcomes, competency mapping, interdisciplinary integration, and professional readiness. Official documents of global regulatory bodies were reviewed and summarised to identify key themes relevant to architectural education. These key themes were used to create word clouds highlighting the main themes, as shown in Figure 7 in the Appendix. Frequencies in the word clouds were then mapped onto a Likert scale, translating qualitative textual data into a semi-quantitative measure for easier comparison, as shown in Table 4.

Indian frameworks, represented by the AICTE and the COA, were compared with international frameworks such as the ARB, RIBA, NAAB, UIA, and AACA. Scores ranged from 1 to 5 (Shannon, 2012).

As shown in Table 4, international educational standards, such as those from the UK (RIBA), the USA (NAAB), and Australia (AACA), emphasise balanced integration between theory and practice. Studios form the core of the curriculum, often comprising 50%, and are supported by internships or practice-based assessments. National curriculum frameworks, including AICTE’s six-month training and COA’s reforms under NEP 2020, include internships and a thesis, but implementation is inconsistent. COA’s multi-exit pathways offer greater flexibility but

struggle to ensure consistent practical readiness (Council of Architecture, 2023). NAAB’s Student Performance Criteria and AACA’s Capability Profiles clearly demonstrate how global models focus on structured learning outcomes and lifelong professional development. These frameworks establish measurable competencies and provide a clear understanding of graduate expectations. India’s COA proposes 30 Graduate Attributes, but it lacks a robust and rigorous system comparable to those of its international counterparts, which use tiered competency applications (Council of Architecture, 2023).

Cross-disciplinary learning, which integrates technology, sustainability, and management, is promoted as a crucial element in global curricula. India encourages such electives through AICTE and COA, although practical implementation varies (All India Council for Technical Education, 2019; Council of Architecture, 2023). Internationally, becoming a professional architect ties academic progress to practice-based examinations, such as ARB Part 3. In India, professional preparation includes internships and professional courses. The COA is currently discussing plans for a licensing examination; however, it does not yet have systems similar to ongoing competency checks, such as RIBA’s CPD framework.

The comparative radar chart, shown in Figure 3, visually represents national and international architectural education standards and policies across seven core aspects.

	Balance between Theory & Practice	Curriculum Focus	Core Components / Program Structure	Learning Outcomes – Competency mapping	Interdisciplinary Integration	Professional Readiness
ARB (UK)	3 design-based learning integrated with technology; real-world focus.	3 Focus on aesthetics, ethics, environment, and building science.	2 11 Graduate Criteria aligned with EU directives.	4 Progressive skill development through Parts 1–3. Explicit K-U-S model evolving toward registration.	4 Encourages engineering and planning integration.	5 Rigorous licensure focus via ARB Part 3.
RIBA (UK)	5 Studio, technical and ethics blended seamlessly.	4 Emphasizes climate, ethics, social equity and safety.	2 6 thematic benchmarks covering full career spectrum.	3 Structured for lifelong learning and CPD-readiness. Mapped to full career pathway and responsibilities.	4 Highly integrated with law, health, ethics, etc.	5 Professional readiness embedded in practice path.
NAAB (USA)	4 Studio-based, real-world learning with community input.	4 Centred on equity, societal impact and research.	3 5 realms with clear Student Performance Criteria (SPC).	5 Outcome-driven, future-oriented, stakeholder focus. Detailed SPC matrix with ethical/design performance.	5 Aligns with climate science, management, computation.	5 Licensure and practice-focused from early stages.
UIA (Global)	4 Balanced theory and practical inquiry + internships.	4 Covers global-local, culture, human needs, tech.	4 Modules across visual, tech, theory, and practice.	3 Focus on professional versatility and ethics. Global competencies in culture, design, and society.	5 Transdisciplinary and multicultural approach.	5 Global reciprocity and validation for practice.
AACA (Australia)	4 Staged education with applied knowledge & assessment.	3 Indigenous, ecological, lifecycle-focused thinking.	3 Performance Criteria with Capability Profiles.	3 Tiered outcomes via reflection and technical growth. Cultural, sustainability, and local context framed.	4 Integration of sociology, tech, Indigenous systems.	5 Practice-based learning aligned with licensure.
AICTE (India)	4 Internships, workshops, studios aligned to practice.	3 Heritage, employability, entrepreneurship-focused.	3 Structured as Core + Specialization with internship.	3 9 learning outcomes focusing on teamwork, ethics. Mapped into 4 competency domains.	5 Choice-based interdisciplinarity	4 Internships and ethics embedded in final semester.
COA (India)	3 practice-integrated with studio & internship.	3 Aligned with NEP 2020: flexibility, interdisciplinarity.	3 Graduate Attributes grouped under design, ethics, etc.	3 Supports lifelong learning and global professionalism. Competencies cover design, ethics, urbanism, etc.	3 Cross-disciplinary pathways via flexible systems.	5 Licensure support, modular registration approach.

**Table 4: Comparative analysis of educational standards set by regulatory bodies worldwide**

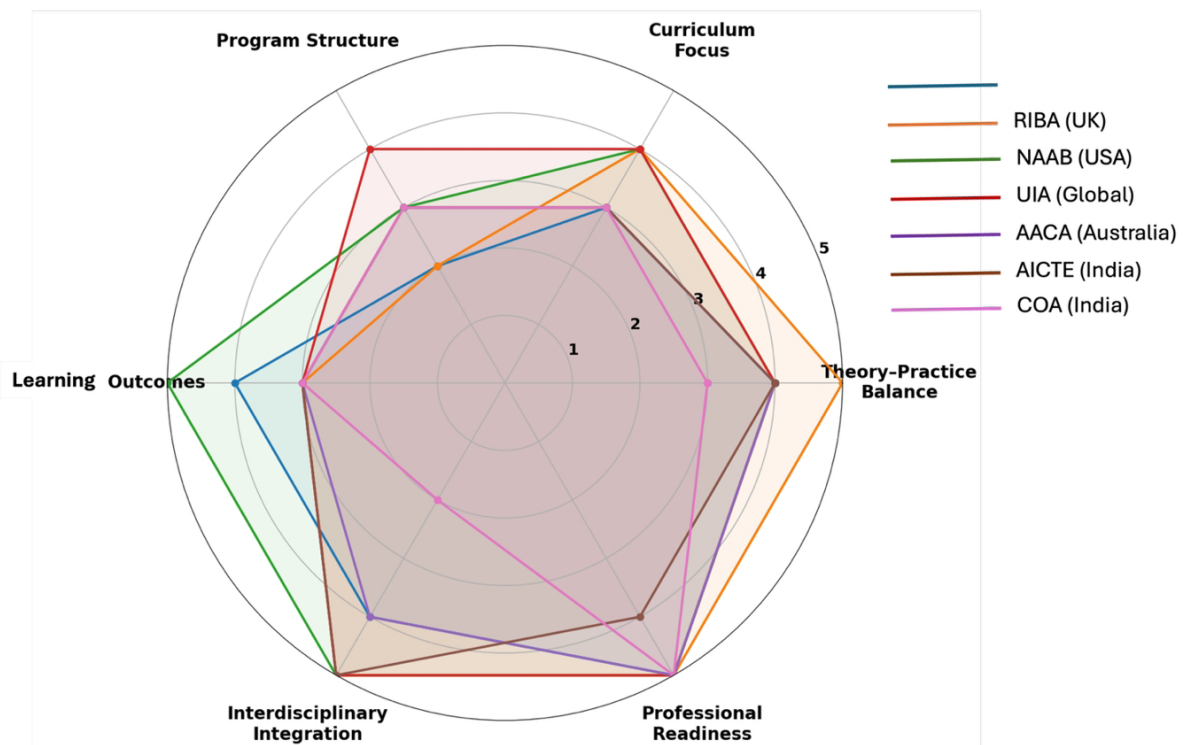


Figure 3: Comparison of Indian and global regulatory bodies

### Alignment between competencies set by COA and academia

As discussed previously, the Council of Architecture (COA), as the dominant regulatory body for architectural education and practice in India, has compiled essential knowledge (K), skills (S), and attributes (A) for architecture graduates through extensive consultations, including:

- stakeholder consultations, in which COA engaged various stakeholders in architecture education, including academic institutions and industry leaders, to gather diverse perspectives on necessary professional competencies;
- analysis of existing practices, including reviews of current national and global educational practices and standards;
- research and benchmarking against allied professions to help establish relevant competencies aligned with evolving architectural demands;
- alignment with national policies such as NEP; and
- workshops and symposia with educators and industry practitioners to validate the proposed competencies and ensure their relevance to the current and future contexts of architecture education.

In its latest circular released in January 2023 (Council of Architecture, 2023), the Council of Architecture (COA) identified several key KSA domains for graduates of accredited architecture programmes, as shown in Table 5.

Architectural education covers key areas, including architectural design, which encompasses aesthetic and functional space creation, and building relationships, which focuses on connections among people, structures, and the environment. Formal ordering systems explore visual perception and design principles in both two- and three-dimensional design. Cultural contexts and global practices examine local, regional, and national traditions, fine arts, diverse histories, and heritage responsibilities, while building

science concepts emphasise technologies that ensure climate comfort and safety. Vocational skills in architecture comprise arts, graphics, digital tools, site analysis, construction materials, and urbanism. Professional skills focus on integrating site planning, structures, services, and cultural and climatic contexts. Critical thinking fosters and nurtures analytical abilities essential for discourse, while ethical sensibilities highlight the architect's societal responsibilities.

Attributes such as social responsibility, understanding human behaviour in relation to the physical environment, and self-awareness promote effective leadership through emotional and ecological intelligence. Lifelong learning ensures adaptability and continuous education in the evolving field.

These competencies, defined by COA in alignment with NEP 2020, help ensure that graduates are prepared with the knowledge, skills, and attributes needed to address architectural challenges.

Table 6 summarises the KSAs defined by institutions such as SPA Delhi, NIT Calicut, KRVA, IIT Roorkee, and NIRMA University. Architecture programmes across Indian institutions blend foundational knowledge, technical expertise, and professional skills. SPA Delhi gives primary focus to sustainability and architectural principles while encouraging innovative thinking. NIT Calicut focuses on sustainable design, interdisciplinary collaboration, and ethical responsibility, while KRVA emphasises and fosters creativity and adaptability to global changes. IIT Roorkee aims to bring together engineering, sustainability, and digital proficiency to address real-world challenges. Nirma University blends theoretical frameworks with digital tools and global exposure, promoting adaptability and research capabilities. A cross-analysis of the knowledge, skills, and attributes (KSAs) identified by COA with the curricula of five national architecture schools was conducted using a 1–5 Likert scale to measure and gauge alignment (Pang et al., 2019). Figure 4 illustrates

	Knowledge	Skills	Attributes
COA	<b>Architectural Design:</b> Understanding aesthetic and functional requirements in architectural design to create liveable habitats.	<b>Vocational Skills:</b> Including arts and graphics, digital competency, site analysis, construction materials, and understanding of urbanism and landscape.	<b>Social Responsibility:</b> Recognition of architects' roles in addressing social factors within their professional practice.
	<b>Building Relationships:</b> Knowledge of the interrelationships between people, buildings, and the environment.	<b>Professional Skills:</b> Ability to integrate site, space planning, structure, and services while considering larger cultural and climatic contexts.	<b>Human Behaviour:</b> Knowledge of how human behaviour interacts with the physical environment, considering diverse needs and values.
	<b>Formal Ordering Systems:</b> Grasping the fundamentals of visual perception and principles of order in two- and three-dimensional design.	<b>Critical/Responsive Thinking:</b> Developing analytical and reflective skills crucial for architectural discourse and practice.	<b>Self-Awareness and Leadership:</b> Promoting self-awareness and understanding various intelligences (emotional, ecological, etc.) crucial for effective leadership in architecture.
	<b>Cultural Contexts:</b> Awareness of local and regional traditions and practices, as well as the influence of fine arts on architectural design.	<b>Ethical Sensibilities:</b> Understanding the ethical responsibilities of the architect in practice and society	<b>Commitment to Lifelong Learning:</b> Preparing graduates to pursue continuous education and adaptation in an evolving professional landscape.
	<b>Global Practices:</b> Knowledge of divergent architectural histories and practices across the world, along with cultural heritage responsibilities.		
	<b>Building Science Concepts:</b> Understanding physical building problems and technologies ensuring comfort and protection from the climate.		

**Table 5: KSAs defined by the Council of Architecture (COA) for a fresh graduate**

College	Knowledge	Skills	Attributes
SPA Delhi	3 - Foundational education in architecture	3 - Application of design principles	3 - Innovative thinking
	- Core subjects covering essential aspects of architecture	- Critical analysis and problem-solving	- Responsibility towards the environment
	- Understanding of sustainability and environmental impact	- Professional communication - Technical proficiency in design tools	- Leadership capabilities
NIT Calicut	2 - Design principles and sustainable architecture	2 - Design development and conceptual skills	2 - Ethical responsibility
	- Knowledge of interdisciplinary collaboration and research methodologies	- Analytical and research skills	- Commitment to societal impacts of design
	- Technical knowledge including structural systems and building technology	- Project management and teamwork	
KRVI	3 - Knowledge in various design domains (knowledge, practice, critical, regional)	3 - Proficiency in design thinking	2 - Critical awareness of architecture's social context
	- Appreciation of the cultural and historical contexts of architecture	- Creative competencies in design	- Adaptability to globalization and technology impacts
IIT Roorkee	4 - Technical knowledge covering engineering principles, building technology	4 - Problem analysis and critical thinking	3 - Professional readiness and ethical standards
	- Sustainability and environmental awareness	- Research and investigation skills - Digital proficiency	- Educational preparedness for real-world challenges
Nirma University	3 - Integrated design processes and theoretical frameworks	2 - Digital representation skills	2 - Flexibility and adaptability in learning
	- Research methodology and proposal development	- General architectural practice skills	- International awareness and exposure

**Table 6: Alignment of KSAs established by COA with premier national universities**

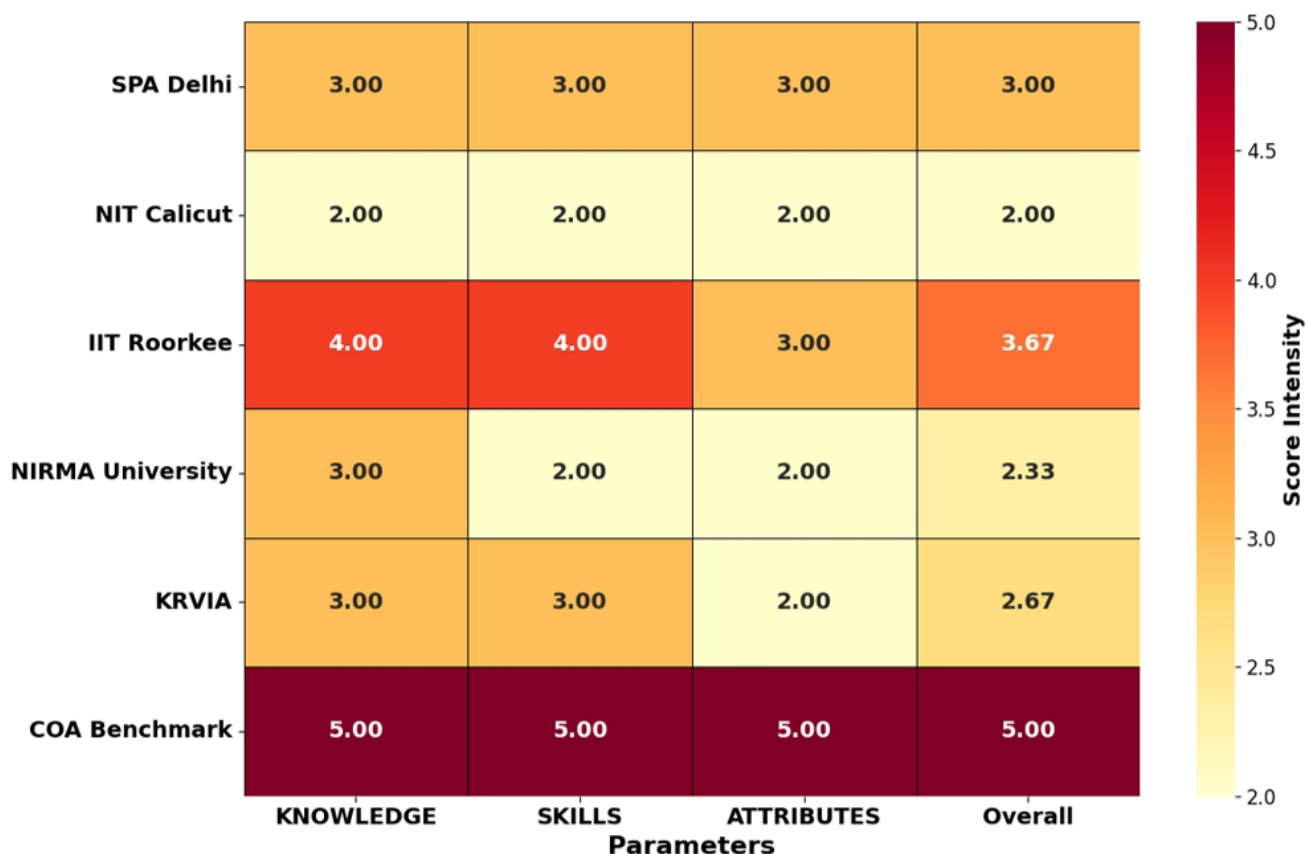


Figure 4: Heat map of the alignment between COA competencies and academic competencies

this alignment and highlights key areas for competency and curriculum enhancement to better align with global standards (Modabber Dabagh, 2019). The significance and implications of these findings are explored in the following discussion.

## DISCUSSION

This study aimed to evaluate and compare ADE curricula across premier architecture schools in India and internationally. It sought to identify commonalities and differences in the curricula and competencies offered by these institutions. In addition, it examined discrepancies among regulatory bodies in India and internationally, as well as the alignment between the competencies set by COA and those of architecture schools in India. By highlighting discrepancies, the study aims to inform architecture schools and regulatory bodies as they reconsider their approaches. Ultimately, it aims to develop a competency assessment framework that encourages alignment and improvement of curriculum standards in India. As shown in Table 3 and Figure 2, the architecture schools clearly highlight the following pattern. International architecture schools are widely recognised for their flexibility, global integration, and interdisciplinary curricula, as also highlighted by Dupre (2021) and Maneshi et al. (2023). In contrast, Indian architecture schools provide strong technical preparation and are attempting to advance rapidly in areas such as artificial intelligence, sustainability, and a wider range of electives. Chandavarkar (2018), Jerome and Maulik (2024), and Naralasetty and Ugrani (2023) support this finding in their studies. Regarding core, major, and minor courses, both types

of institutions equip students effectively with foundational and advanced design concepts. However, the most noticeable discrepancy and challenge lies in integrating interdisciplinary and innovation-focused learning, followed by differences in curricular emphasis (Pandit, 2019; Hammadamin and Nordin, 2024). Overall, while both systems have strengths, integrating emerging technological developments and more collaborative learning methods could enrich and strengthen the traditional frameworks of architectural design education, particularly in Indian schools.

As shown in Table 4 and Figure 3, the comparison of regulatory bodies in India and internationally provides the following insights. NAAB (USA) and UIA (Global) emerge as global leaders, scoring the highest across all metrics. Bhattacharjee and Bose (2015) highlight how these two bodies maintain robustly blended academic practices that contribute to their global leadership status. AACA (Australia) and ARB (UK) are well balanced, especially in relation to sustainability and indigenous or local relevance. Dupre (2021) supports this finding and discusses Australia’s innovative inclusion of local contexts and sustainability in architectural education, supporting AACA’s focus. AICTE (India) focuses primarily on employability and applied knowledge but could benefit from more globally aligned competency and outcome structures. Bongirwar and Das (2022) and Shannon (2012) both discuss India’s emphasis on job readiness through practical training. However, gaps remain in outcome-based education (OBE) and global competency benchmarking. COA (India) shows strong

alignment with NEP 2020 reforms and particularly aims to strengthen interdisciplinarity and professional readiness. However, it underperforms in balancing theory and practice, establishing a strong curricular focus, and ensuring consistent learning outcomes. Naralasetty and Ugrani (2023) and Jerome and Maulik (2024) show that COA has embraced the NEP 2020 vision by promoting professional relevance and interdisciplinarity. Nevertheless, challenges persist in curriculum coherence, particularly when aligning theory with practice.

In summary, NAAB and UIA are global frontrunners in architectural education, while other bodies, such as AACA, ARB, AICTE, and COA, demonstrate multiple strengths and challenges in domains such as sustainability, employability, and curriculum coherence. These findings highlight areas where reform and revision are needed.

As illustrated in Figure 4, the alignment between the KSAs set by COA and those established by premier architecture schools in India varies. Keeping COA as the benchmark, IIT Roorkee exhibits the highest alignment (score = 3.67) with COA-prescribed competencies, scoring highly in the knowledge and skill domains and moderately in the attribute domain. IIT Roorkee aims to bring together engineering, sustainability, and digital proficiency to address real-world challenges. SPA Delhi displays moderate alignment with the KSAs prescribed by COA, with an overall score of 3. SPA Delhi gives primary focus to architectural principles and sustainability while encouraging innovative thinking. KRVA aligns moderately well in the knowledge and skill domains but falls short in attributes. KRVA emphasises and fosters creativity and adaptability to global changes. NIT Calicut and NIRMA University both have below-average scores, displaying low alignment with the COA-prescribed competencies.

The findings from the parameter comparison between national regulatory bodies sharply contrast with those from the curriculum framework analysis of the five national architecture schools in the interdisciplinary integration domain. A similar contrast is observed in the curriculum focus domain, revealing gaps in the broader framework. Moreover, AICTE takes a more traditional or orthodox approach and needs to re-evaluate and reconsider its strategies, which is corroborated by Bongirwar and Das (2022). In contrast, COA aims to align more closely with global regulatory bodies (Naralasetty and Ugrani, 2023; Chandavarkar, 2018). Yet, architecture schools in India, including premier institutions, show discrepancies and

hesitation in adopting the KSAs set by COA, which is again supported by Pandit (2019). This study is limited by its specific educational context: the selected architecture schools in India and globally, as well as the accrediting bodies considered. This may affect broader generalisability.

## Competency-based assessment framework and its implications

Given the identified gaps in ADE in India and the best practices followed by NAAB and RIBA, a competency assessment framework is proposed. The framework was designed based on curriculum, standards, policy analysis, and the alignment of curricula with COA-prescribed competencies.

The proposed competency assessment framework supports the standardisation of competency evaluation across stakeholders. This can help architecture schools in India become more efficient and responsible in delivering quality architectural education. Reducing ambiguous assessment criteria can streamline academic evaluation processes, improve the comparability of student performance, and facilitate quicker interpretation of competencies by recruiters. Beyond operational efficiency, the framework also aims to support responsible educational practice. Transparent competency indicators can promote fairness and accountability in assessment while reducing risks associated with subjective evaluation. Finally, the competency assessment framework is envisioned as a practical, measurable, and adaptable tool to help all three stakeholders:

- a) students recognise their strengths and address their shortcomings;
- b) recruiters select talent based on framework analysis; and
- c) faculty customise the framework based on curriculum and student performance at each architecture school, considering curricular focus or contextual differences. In addition, it will enable longitudinal tracking of students' overall academic performance.

The initial step involved cross-analysing and categorising all KSAs into a framework composed of six distinct domains, as illustrated in Table 7.

The assessment framework was renamed the PREDICT assessment framework, derived from the initials of its constituent domains. Subsequently, the courses prescribed by COA were systematically aligned in Table 8 with the six identified competency domains using a statistical programming tool to provide a clearer understanding of the evaluation rubric (Kabir et al., 2024).

Competency Domain	What it covers	K/S/A
Professionalism & Lifelong Learning	Project management, regulation compliance, entrepreneurship, CPD-readiness.	S, A
Research & Critical Analysis	Problem-solving, contextual analysis, evidence-based design, future-readiness.	K, S
Ethics & Social Responsibility	Professional integrity, public safety, sustainability, cultural awareness.	S, A
Design Thinking & Innovation	Conceptual ability, creativity, user-centric design, iterative refinement.	S, A
Communication & Collaboration	Visual, verbal, and written communication; teamwork; Interpersonal engagement.	K, S
Technical Proficiency	Building systems, environmental design, digital tools, structural understanding.	K, A

**Table 7: Competency domains identified from COA-prescribed KSAs (where K is Knowledge, S is Skills, and A is Attributes)**

Course/Subject	Mapped Domain	K/S/A
Architectural Design Studios (I to Thesis)	Design Thinking & Innovation	S, A
Architectural Design Studios (I to Thesis)	Communication & Collaboration	S, A
Architectural Design Studios (I to Thesis)	Technical Proficiency	K, S
Building Construction & Materials	Technical Proficiency	K, S
Building Services	Technical Proficiency	K, S
Structural Systems & Design	Technical Proficiency	K, S
Environmental Studies / Climatology / Sustainability	Ethics & Social Responsibility	K, A
Environmental Studies / Climatology / Sustainability	Technical Proficiency	K, S
History, Theory & Humanities	Research & Critical Analysis	K, S
History, Theory & Humanities	Ethics & Social Responsibility	K, A
Working Drawing, Cost Estimation & Project Management	Professionalism & Lifelong Learning	K, A
Working Drawing, Cost Estimation & Project Management	Technical Proficiency	K, S
Urban Design & Landscape Design	Design Thinking & Innovation	S, A
Urban Design & Landscape Design	Research & Critical Analysis	K, S
Professional Practice / Legal Responsibilities	Professionalism & Lifelong Learning	K, A
Professional Practice / Legal Responsibilities	Ethics & Social Responsibility	K, A
Internship / Training	Professionalism & Lifelong Learning	K, A
Soft Skills / Communication / Life Skills	Communication & Collaboration	S, A
Soft Skills / Communication / Life Skills	Professionalism & Lifelong Learning	K, A
Research Writing / Thesis Report / Dissertation	Research & Critical Analysis	K, S
Research Writing / Thesis Report / Dissertation	Design Thinking & Innovation	S, A

**Table 8: Association mapping of COA-defined courses to the six competency domains (where K is Knowledge, S is Skills, and A is Attributes)**

To evaluate individual competencies in ADE, a four-level rubric is proposed, modified, and adapted from Lutnaes (2018), Pop-Iliev and Platanitis (2008), and Allen and Tanner (2006). The rubric assesses student performance based on

defined knowledge, skills, and attributes. The terminology has been rephrased to present a more positive, encouraging, and constructive tone in order to enhance students' and potential recruiters' motivation.

<b>Level 1 – Emerging (0-25%)</b>	<b>Level 2 – Developing (26-50%)</b>	<b>Level 3 – Proficient (51-75%)</b>	<b>Level 4 – Advanced (76-100%)</b>
The learner has a limited understanding of the competency, needing continuous guidance to apply concepts.	The student shows a basic level of skill related to the competency, performing tasks with some success, but lacks consistency.	The learner applies the competency effectively and independently, showing confidence and a solid grasp of related concepts.	The learner integrates the competency across contexts, innovates, or leads others in its use, reflecting high autonomy, creativity, and leadership competency.

**Table 9: Competency Evaluation Rubric**

### Validation of the competency-based assessment framework

To study the adoption and execution of the proposed PREDICT framework, six student work samples from below-average, average, and above-average categories were considered.

The studio course from Year 4 was selected to validate the competency-based assessment framework because the course addresses all competency domains. The importance assigned to each competency domain varies, as shown in Table 10, according to the faculty member leading the course.

C1	<b>Professionalism &amp; Lifelong Learning</b> (Project management + CPD-readiness)	10%
C2	<b>Research &amp; Critical Analysis</b> (Problem-solving + contextual analysis)	20%
C3	<b>Ethics &amp; Social Responsibility</b> (Professional integrity + sustainability)	10%
C4	<b>Design Thinking &amp; Innovation</b> (Conceptual ability + creativity + user-centric design)	30%
C5	<b>Communication &amp; Collaboration</b> (teamwork + interpersonal effectiveness)	10%
C6	<b>Technical Proficiency</b> (Building systems + digital tools competence)	20%

**Table 10: Distribution of competency weightage for the studio course**

After evaluating the six student projects, a visual competency profile was created for each, as shown in Figure 5. In the competency profile visualisation, the scoring scale is divided

into four performance levels aligned with the competency rubric: 0–25 (Emerging), 26–50 (Developing), 51–75 (Proficient), and 76–100 (Advanced). In the current study, only one course

was selected to demonstrate the application of the competency framework. However, the framework needs to be applied to each

course across semesters and across all years so that a cumulative competency profile can be developed for each student.

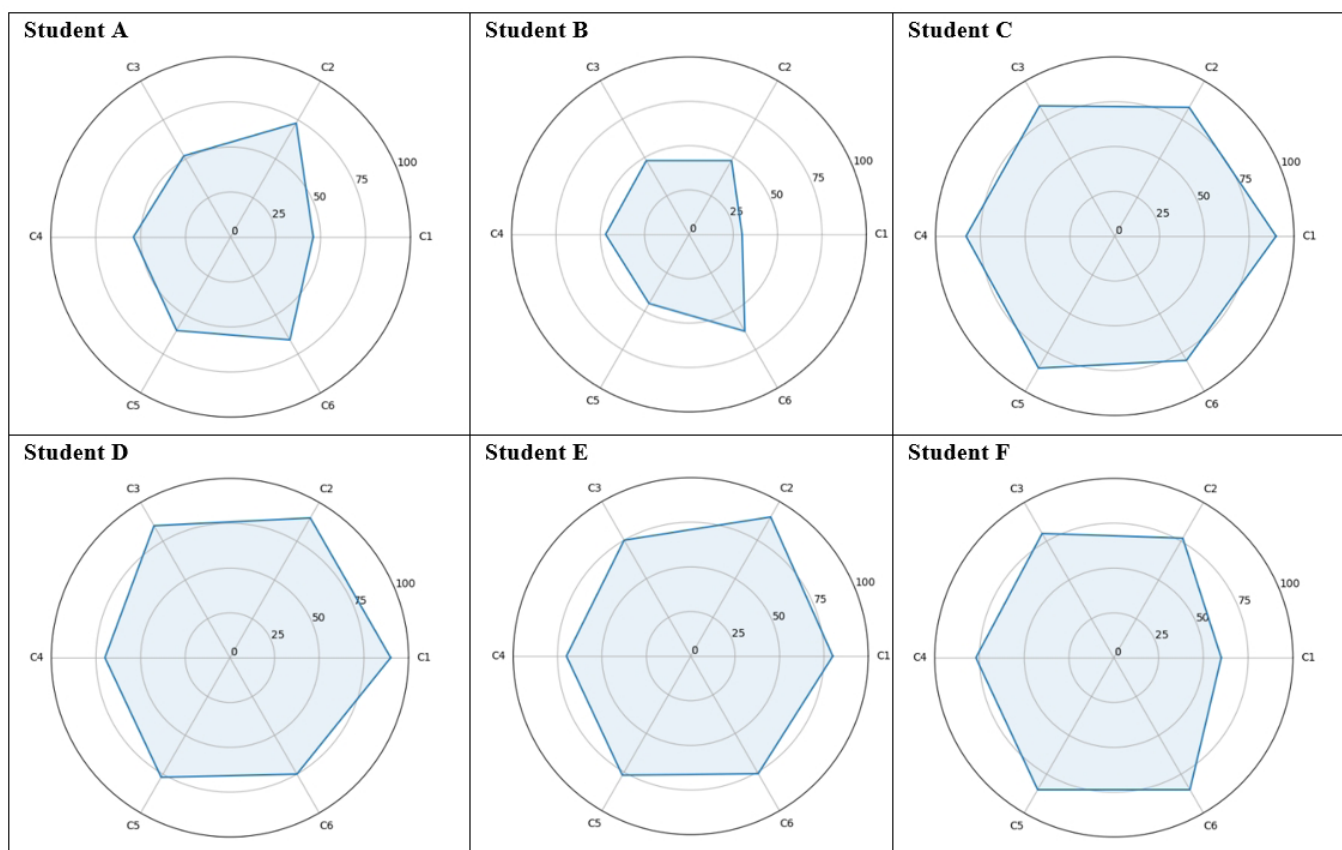


Figure 5: Distribution of competency weightage for the studio course

An overall analysis of the radar chart data across the six competency domains shows a generally strong performance profile, with a few clear areas for improvement. When the performance of all students is averaged, C2—Research and Critical Analysis and C3—Ethical and Social Responsibility emerge as the strongest domains, each with an average of about 82%. C5—Communication and Collaboration also appears as a stable strength, with an average of around 80% and no student scoring below 60%, making it another reliable area of performance across the cohort. C6—Technical Proficiency shows reasonably good performance, with an average of approximately 78%. However, there is some variation in scores, indicating that foundational understanding remains unclear and is still developing for some students. The first major area of concern is C4—Design Thinking and Innovation, which has a lower average of about 73.5% and a wide score spread ranging from 56% to 87%. C1—Professionalism and Lifelong Learning is also a major area of concern, with substantial variation in student scores.

Visual representations of competency profiles can help all three stakeholder groups in several ways: academics can study curriculum effectiveness, students can become more self-aware of their strengths and work on areas for growth, and practitioners can benefit from job-ready profiles. Analysis of competency profiles after every semester and year can reveal repeated weak competency areas, curriculum gaps, skill gaps in the graduating

cohort, and alignment with industry expectations. The pilot testing of the framework demonstrates its potential to improve efficiency and support responsible assessment practices.

## CONCLUSION

This study reviewed the current state of ADE in India and internationally to reveal noticeable gaps in academia. Architecture schools worldwide prioritise interdisciplinary learning, innovation, and global perspectives. They combine theory and practice, emphasising sustainability, cultural depth, regional relevance, professional readiness, and societal impact while integrating internships and vernacular design to align education with global challenges. Global bodies such as ARB, RIBA, NAAB, and UIA emphasise design depth, ethics, and interdisciplinary exposure. Meanwhile, Indian institutions such as AICTE and, more prominently, COA prioritise regional relevance, employability, and flexibility in line with NEP 2020. All frameworks foster competency-based learning by blending technical skills with cultural awareness. However, Indian architecture colleges face challenges in aligning with COA standards because of limited flexibility, inadequate technology integration, and inconsistent operational practices compared with global institutions.

In response to these insights, this study proposes the competency-based PREDICT assessment framework as a strategic tool for bridging the identified gaps. The framework

defines a structured set of six competencies. The gaps identified in ADE can be addressed through the six competency domains of the PREDICT framework. Weak industry readiness and limited exposure to practice are mitigated through Professionalism and Lifelong Learning (C1), which strengthens project management, regulatory awareness, and continuous professional development. The shortcomings in critical thinking and research orientation are addressed by Research and Critical Analysis (C2), which fosters evidence-based design and contextual problem-solving. Gaps related to ethics, sustainability, and social responsibility are aligned with Ethics and Social Responsibility (C3), embedding environmental and cultural awareness in design processes. Constraints on creativity caused by rigid curricula are countered by Design Thinking and Innovation (C4), which promotes user-centred, iterative, and exploratory approaches. Similarly, deficiencies in communication and teamwork are addressed through Communication and Collaboration (C5),

enhancing interdisciplinary engagement and presentation skills. Finally, technical skill gaps are bridged by Technical Proficiency (C6), which strengthens competence in building systems and digital tools and thereby narrows the gap between academia and practice.

The PREDICT framework supports the study's aims by balancing theory and practice and by requiring regular curriculum review to match the competency framework. Once adopted by all colleges, it can promote consistency and accountability in curriculum content and assessment. By standardising competency criteria for students, educators, and recruiters, it can foster efficient assessment and decision-making. Overall, it enhances responsible architectural education and aligns theoretical knowledge with practical training. Future work will involve testing this assessment framework on a larger scale across all stakeholders, collecting feedback from educators, practitioners, and students, and refining the tool for broader implementation in architecture schools.

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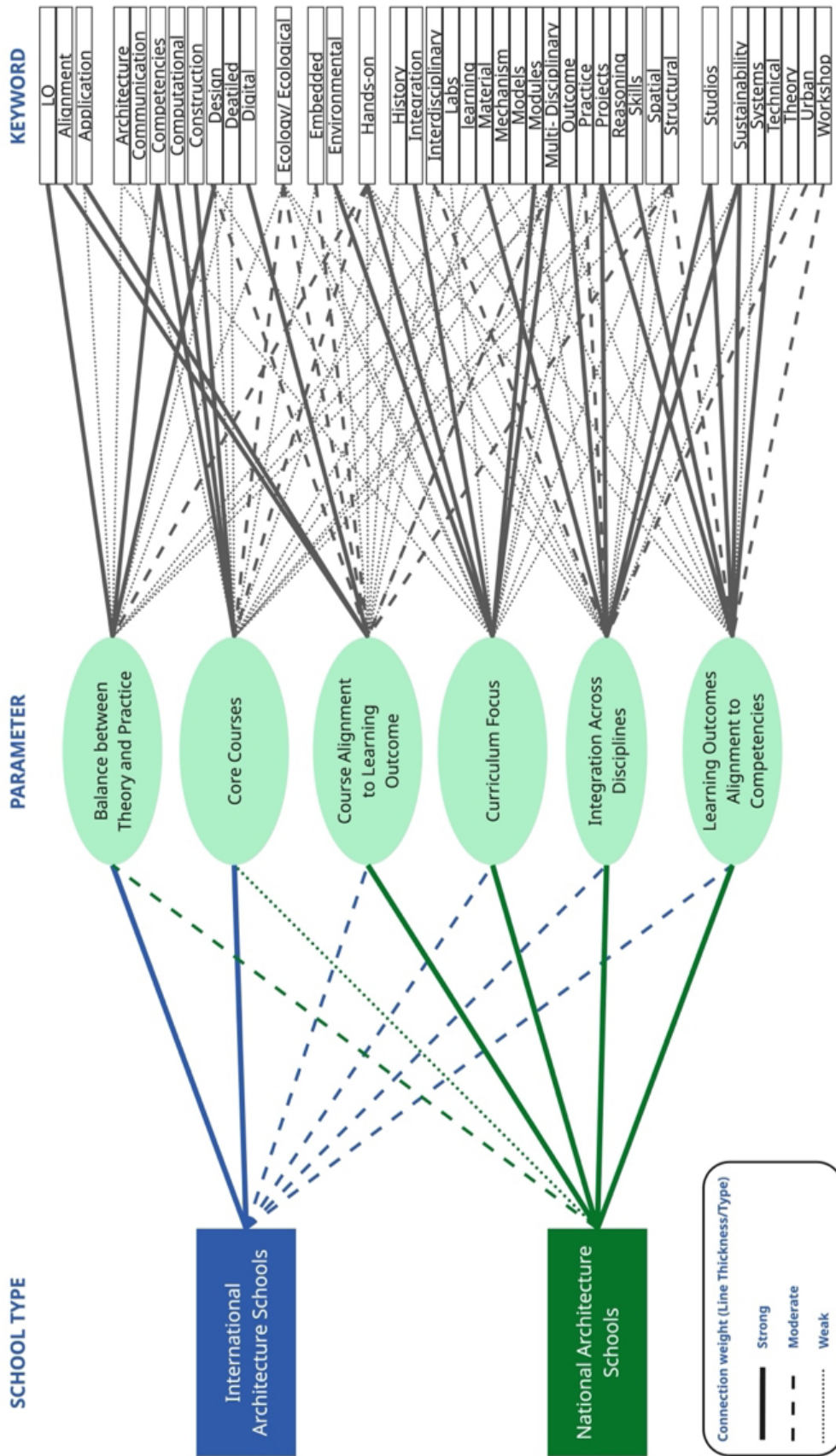


Figure 6: Network diagram showing analysis of global and Indian architecture schools

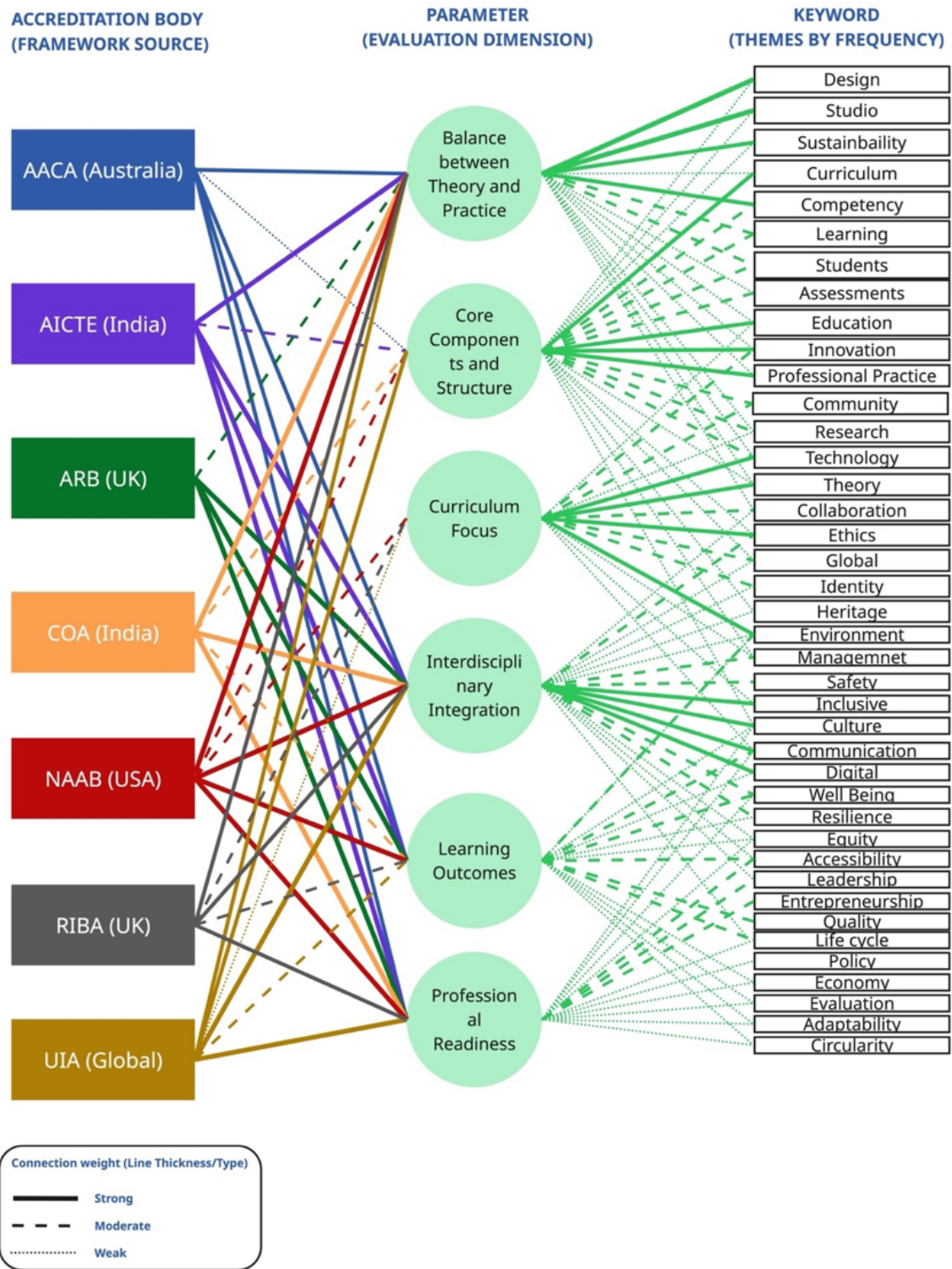


Figure 7: Network diagram showing analysis of global architecture regulatory bodies