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Nyaya Logic as a Framework for Critical Thinking in Higher Education: An Indian Knowledge System Model for 21st-Century Learning

Shrutika Sahu^{1*}¹M.Ed. Student, Bethesda Women Teachers' Training College, Ranchi, Affiliated to Ranchi University, Ranchi, Jharkhand, India

* Corresponding author. E-mail: shruti02121999@gmail.com

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ABSTRACT

The increasing complexity of the twenty-first century has transformed higher education into a space where learners are expected not only to acquire knowledge but also to develop critical thinking, analytical reasoning, ethical judgment, and evidence-based decision-making skills. While contemporary critical thinking frameworks have largely been influenced by Western philosophical traditions, the rich intellectual heritage of the Indian Knowledge System (IKS) offers equally rigorous yet underutilized perspectives on reasoning and knowledge construction. Among the classical Indian philosophical schools, Nyaya Darshana stands out for its systematic treatment of logic, epistemology, inference, argumentation, and the evaluation of valid knowledge. This conceptual paper examines the relevance of Nyaya Logic as a foundational framework for strengthening critical thinking pedagogy in higher education. Drawing upon classical Nyaya literature, contemporary scholarship on critical thinking, and policy documents such as the National Education Policy (NEP) 2020, the study explores the correspondence between Nyaya concepts—including *Pramāṇa* (means of valid knowledge), *Anumāna* (inference), *Tarka* (logical reasoning), *Hetvābhāsa* (logical fallacies), *Vāda* (constructive debate), and *Nirṇaya* (reasoned judgment)—and essential twenty-first-century cognitive competencies. The paper proposes an original Nyaya-Based Critical Thinking Model (NBCTM) that integrates indigenous epistemological principles with modern pedagogical practices. The model positions Nyaya Logic as a systematic process through which learners progress from evidence gathering and analytical reasoning to reflective judgment and ethical decision-making. Such a framework has the potential to enrich curriculum design, classroom dialogue, research methodology, teacher education, media literacy, and inquiry-based learning. The paper argues that integrating Nyaya Logic into higher education can contribute to the development of intellectually rigorous, ethically responsible, and critically reflective graduates while advancing the objectives of the Indian Knowledge System envisioned in the National Education Policy 2020. The proposed model also provides a conceptual foundation for future empirical research on indigenous approaches to critical thinking in higher education.

INTRODUCTION

Higher education in the twenty-first century is witnessing

unprecedented transformations driven by rapid technological innovation, globalization, artificial

intelligence, and the exponential growth of information. Universities are no longer expected merely to transmit disciplinary knowledge; they are increasingly responsible for nurturing graduates who can critically evaluate evidence, solve complex problems, communicate effectively, and make informed ethical decisions. Consequently, **critical thinking** has emerged as one of the most essential competencies for contemporary learners and has been recognized worldwide as a fundamental learning outcome of higher education.

Despite its widespread acceptance, the theoretical foundations of critical thinking used in educational research and practice are predominantly derived from Western philosophical traditions, including the works of Socrates, Aristotle, John Dewey, Robert Ennis, Richard Paul, and Linda Elder. These frameworks have significantly influenced curriculum design, pedagogy, and assessment practices across higher education institutions. However, they represent only one intellectual tradition of reasoning and knowledge construction.

The **Indian Knowledge System (IKS)** offers a rich philosophical heritage that has long emphasized rational inquiry, logical analysis, debate, and evidence-based understanding. Among the six classical schools of Indian philosophy (*Ṣaḍdarśanas*), **Nyaya Darshana**, traditionally attributed to the sage Gautama (Akṣapāda), is particularly noteworthy for its systematic exploration of logic and epistemology. Rather than relying solely on abstract speculation, Nyaya develops structured methods for acquiring valid knowledge, examining evidence, identifying fallacious reasoning, and arriving at justified conclusions.

The Nyaya tradition identifies four valid means of knowledge (*Pramāṇas*): **Pratyakṣa** (perception), **Anumāna** (inference), **Upamāna** (comparison), and **Śabda** (authoritative testimony). Together with concepts such as **Tarka** (logical reasoning), **Hetvābhāsa** (fallacious reasoning), **Vāda** (constructive debate), and **Nirṇaya** (reasoned judgment), these principles constitute a comprehensive framework for disciplined inquiry and intellectual rigor. Interestingly, these concepts closely resemble many competencies associated with contemporary critical thinking, including observation, evidence evaluation, analytical reasoning, argument analysis, reflective judgment, and collaborative dialogue.

The growing emphasis on integrating Indian Knowledge Systems into higher education, particularly following the **National Education Policy (NEP) 2020**, has created an opportunity to revisit indigenous epistemological traditions and explore their educational relevance. NEP 2020 advocates the incorporation of Indian knowledge traditions

into curriculum, pedagogy, research, and teacher education while promoting holistic, multidisciplinary, and inquiry-based learning. Despite this policy emphasis, relatively limited attention has been given to the pedagogical potential of Nyaya Logic as a framework for developing critical thinking competencies among university students.

This paper addresses this gap by proposing a conceptual model that integrates Nyaya Logic with contemporary critical thinking pedagogy. Instead of viewing Nyaya merely as a historical philosophical system, the study interprets it as a dynamic educational framework capable of supporting evidence-based reasoning, reflective inquiry, academic dialogue, and ethical decision-making in modern higher education.

NEED AND SIGNIFICANCE OF THE STUDY

The twenty-first century has transformed higher education into an environment characterized by rapid technological advancements, global interconnectedness, artificial intelligence, digital communication, and unprecedented access to information. While these developments have expanded opportunities for learning and innovation, they have also created significant challenges, including information overload, misinformation, algorithmic bias, superficial learning, and declining analytical engagement. Consequently, higher education institutions are increasingly expected to cultivate learners who possess not only disciplinary expertise but also the capacity for critical inquiry, evidence-based reasoning, reflective judgment, and ethical decision-making.

Critical thinking has therefore become a central educational objective across universities worldwide. It is widely regarded as an essential graduate attribute that enables students to evaluate evidence, distinguish valid arguments from fallacious reasoning, solve complex problems, and participate responsibly in democratic and academic discourse. However, the conceptual foundations of critical thinking adopted in most higher education curricula remain predominantly rooted in Western philosophical traditions. Although these frameworks have made valuable contributions, they represent only one intellectual perspective on reasoning and knowledge.

India possesses one of the world's oldest traditions of logical inquiry through the **Nyaya school of philosophy**, which developed a sophisticated system of epistemology, inference, debate, and rational investigation. Nyaya offers systematic methods for evaluating knowledge claims through the concepts of *Pramāṇa*, *Anumāna*, *Tarka*, *Hetvābhāsa*, *Vāda*, and *Nirṇaya*. These principles correspond closely with many competencies currently associated with critical thinking, including observation,

analysis, inference, evaluation, logical consistency, and reflective judgment. Despite this strong theoretical alignment, Nyaya Logic remains largely absent from contemporary pedagogical frameworks in higher education.

The **National Education Policy (NEP) 2020** has emphasized the integration of the Indian Knowledge System into teaching, research, curriculum development, and teacher education. The policy advocates multidisciplinary learning, inquiry-based pedagogy, ethical education, and the revival of India's intellectual traditions. Nevertheless, there remains limited scholarly work translating classical Indian philosophical concepts into practical pedagogical models that can be implemented in university classrooms.

This study addresses this educational need by conceptualizing Nyaya Logic as a pedagogical framework for critical thinking rather than merely as a historical philosophical system. The proposed model demonstrates how indigenous epistemological principles can complement contemporary educational practices while strengthening students' analytical, reflective, and ethical capacities. The study therefore contributes simultaneously to the advancement of Indian Knowledge Systems, critical thinking pedagogy, and higher education reform.

RESEARCH GAP

A review of existing literature indicates that substantial research has been conducted on critical thinking in higher education, cognitive development, inquiry-based learning, and contemporary pedagogical strategies. Similarly, numerous philosophical studies have explored Nyaya Darshana from historical, epistemological, and metaphysical perspectives. However, these two streams of scholarship have rarely been integrated into a unified educational framework.

Existing studies primarily exhibit the following gaps:

- Most critical thinking frameworks adopted in higher education are derived from Western philosophical traditions, with limited incorporation of indigenous epistemological systems.
- Studies on Nyaya philosophy generally focus on its historical, logical, or metaphysical dimensions rather than its pedagogical applications in higher education.
- Very few conceptual studies explicitly map Nyaya principles such as *Pramāṇa*, *Tarka*, *Hetvābhāsa*, and *Vāda* to contemporary critical thinking competencies.
- There is an absence of an integrated **Indian Knowledge System-based conceptual model** that systematically connects Nyaya Logic with twenty-first-century learning

outcomes.

- Limited attention has been given to the relevance of Nyaya Logic for addressing contemporary educational challenges such as misinformation, digital literacy, evidence evaluation, ethical reasoning, and academic dialogue.

Accordingly, the present study seeks to bridge this gap by proposing a structured conceptual model that positions Nyaya Logic as an indigenous framework for strengthening critical thinking pedagogy in higher education.

OBJECTIVES OF THE STUDY

The present study is guided by the following objectives:

1. To examine the fundamental principles of Nyaya Logic relevant to reasoning and knowledge construction.
2. To analyze the relationship between Nyaya Logic and contemporary critical thinking competencies in higher education.
3. To develop an **Indian Knowledge System-based conceptual model** integrating Nyaya Logic with critical thinking pedagogy for twenty-first-century learning.

To discuss the pedagogical implications of the proposed model for curriculum development, teaching-learning practices, teacher education, and higher education policy

METHODOLOGY

This study adopts a **conceptual qualitative research design** based exclusively on secondary sources of data. The paper does not involve empirical data collection; instead, it synthesizes classical philosophical literature and contemporary educational scholarship to develop an original conceptual framework

RESEARCH DESIGN

5.

The research is conceptual and analytical in nature. It aims to interpret, compare, and integrate ideas from Nyaya philosophy with established theories of critical thinking in higher education.

5.

Data Sources

The study relies on multiple categories of secondary literature, including:

- Classical Nyaya texts and authoritative translations.
- Scholarly books and peer-reviewed journal articles on Nyaya philosophy.
- Research literature on critical thinking and higher education.

- Literature on the Indian Knowledge System.
 - National Education Policy (NEP) 2020 and related policy documents.
 - International reports on twenty-first-century competencies and higher education.
- 5.

Method of Analysis

The study employs **qualitative content analysis** and **comparative conceptual analysis**. Relevant concepts from Nyaya philosophy are identified, interpreted, and systematically compared with contemporary dimensions of critical thinking. Based on this comparative analysis, an original **Nyaya-Based Critical Thinking Model (NBCTM)** is developed to demonstrate the educational applicability of Nyaya Logic within modern higher education.

5.

Scope of the Study

The study is limited to the conceptual integration of Nyaya Logic with critical thinking pedagogy in higher education. It does not empirically test the proposed model; rather, it provides a theoretical foundation that can guide future empirical investigations and curriculum development initiatives.

THEORETICAL FOUNDATIONS OF NYAYA LOGIC

Understanding Nyaya Darshana

Nyaya Darshana is one of the six orthodox (*Āstika*) schools of Indian philosophy and is traditionally attributed to the sage **Akṣapāda Gautama**, the author of the *Nyaya Sutra*. The term *Nyaya* literally means "method," "rule," or "logical procedure." Over time, it came to signify a systematic discipline of reasoning, argumentation, and epistemological inquiry.

Unlike philosophical traditions that primarily emphasize metaphysical speculation, Nyaya is fundamentally concerned with **how valid knowledge is acquired, tested, and justified**. It establishes rigorous methods for examining claims, evaluating evidence, detecting errors in reasoning, and reaching rational conclusions. Consequently, Nyaya has often been regarded as India's classical school of logic and epistemology.

The central objective of Nyaya is the attainment of **true knowledge (Pramā)**, which enables individuals to overcome ignorance (*Avidyā*) and make sound judgments. In contemporary educational terms, this emphasis aligns closely with the goals of critical thinking, where learners are expected to evaluate information systematically rather

than accept it uncritically.

The relevance of Nyaya extends beyond philosophy. Its structured approach to observation, inference, debate, and evidence evaluation provides an intellectual framework that can inform higher education pedagogy, inquiry-based learning, academic research, and ethical decision-making.

Epistemology in Nyaya: The Concept of Pramā and Pramāṇa

Nyaya philosophy distinguishes between **valid knowledge (Pramā)** and **invalid knowledge (Apramā)**. According to Nyaya, knowledge is considered valid only when it accurately corresponds to reality and is obtained through reliable means.

The means of acquiring valid knowledge are known as **Pramāṇas**. Classical Nyaya recognizes four accepted Pramāṇas:

1. **Pratyakṣa (Perception)**
2. **Anumāna (Inference)**
3. **Upamāna (Comparison or Analogy)**
4. **Śabda (Verbal Testimony of a Reliable Source)**

These four means collectively provide a comprehensive framework for acquiring and validating knowledge. Modern higher education similarly expects students to observe, analyse, compare, infer, and evaluate credible sources before reaching conclusions. Thus, Nyaya's epistemology shares important common ground with contemporary educational approaches.

Pratyakṣa (Perception): Observation as the Foundation of Inquiry

Pratyakṣa refers to knowledge obtained through direct sensory perception. According to Nyaya, perception constitutes the primary source of reliable knowledge because it establishes the initial contact between the learner and reality.

In educational settings, perception forms the basis of scientific observation, classroom experimentation, field studies, laboratory work, and experiential learning. Students first observe phenomena before formulating questions or explanations.

For example, during a science experiment, learners observe a chemical reaction before attempting to explain its causes. Similarly, in social science research, researchers begin by observing social realities before developing hypotheses.

Therefore, Pratyakṣa represents the first stage of critical thinking, emphasizing careful observation rather than premature judgment.

Anumāna (Inference): Developing Evidence-Based

Reasoning

Anumāna refers to knowledge acquired through logical inference. Unlike perception, inference allows individuals to draw conclusions about phenomena that are not directly observable by connecting available evidence with established relationships.

The classical Nyaya example involves observing smoke on a distant hill and inferring the presence of fire based on prior knowledge that smoke is invariably associated with fire.

In higher education, inference underlies numerous academic activities, including:

- scientific hypothesis formation,
- interpretation of research findings,
- statistical reasoning,
- policy analysis,
- educational decision-making,
- evidence-based argumentation.

Inference encourages students to move beyond memorization and engage in analytical reasoning grounded in evidence. This capacity is central to critical thinking and research methodology.

Upamāna (Comparison): Learning through Analogy

Upamāna refers to acquiring knowledge through comparison or analogy. Learners understand unfamiliar concepts by relating them to previously known experiences.

Modern pedagogy extensively employs analogical reasoning:

- comparing democratic systems across countries,
- relating biological structures to familiar objects,
- understanding educational theories through comparative frameworks,
- using case studies in management and teacher education.

Comparison promotes conceptual clarity and helps learners transfer knowledge across different contexts. It also strengthens abstraction and pattern recognition, both of which are important dimensions of higher-order thinking.

Śabda (Reliable Testimony): Evaluating Credible Knowledge Sources

Śabda refers to valid knowledge obtained through trustworthy verbal testimony or authoritative sources. Nyaya does not encourage accepting every statement as true; rather, testimony is considered valid only when it originates from a competent, reliable, and truthful source.

This principle has remarkable relevance in the digital age, where students encounter information from social media, websites, blogs, AI-generated content, and numerous online platforms.

Within higher education, Śabda translates into:

- evaluating peer-reviewed research,
- verifying academic credibility,
- distinguishing scholarly evidence from misinformation,
- assessing source reliability,
- practising responsible citation.

Thus, Śabda promotes information literacy and academic integrity—skills that are increasingly important in twenty-first-century learning.

Tarka (Logical Reasoning): Strengthening Analytical Thinking

Tarka refers to reflective reasoning used to examine arguments, resolve doubts, and test competing explanations. Rather than accepting claims at face value, Tarka encourages systematic questioning and logical examination.

In higher education, Tarka is reflected in:

- analysing competing theories,
- evaluating research evidence,
- solving complex problems,
- constructing logical arguments,
- participating in inquiry-based learning.

Tarka develops intellectual discipline by encouraging learners to justify their conclusions through coherent reasoning. It therefore represents the analytical core of critical thinking pedagogy.

Hetvābhāsa (Logical Fallacies): Recognising Errors in Reasoning

One of Nyaya's most sophisticated contributions is its detailed analysis of **Hetvābhāsa**, or fallacious reasoning. A Hetvābhāsa appears to be a valid argument but contains a defect that renders the conclusion unreliable.

In contemporary higher education, the ability to identify logical fallacies is indispensable. Students frequently encounter:

- misleading advertisements,
- manipulated statistics,
- biased media reports,
- pseudoscientific claims,
- unsupported academic arguments.

Teaching learners to recognize fallacies helps them

evaluate information critically rather than accepting persuasive but flawed reasoning. This skill is increasingly relevant in an era of misinformation and digital content overload.

Vāda (Constructive Dialogue): Learning through Rational Discussion

Nyaya views knowledge as something refined through disciplined dialogue. **Vāda** refers to constructive debate in which participants seek truth through logical argument, mutual respect, and evidence rather than through personal victory.

In higher education, Vāda aligns with:

- seminar discussions,
- classroom debates,
- collaborative learning,
- peer review,
- academic conferences,
- research supervision.

Unlike adversarial argument, Vāda promotes respectful intellectual exchange. It encourages students to defend their ideas with evidence while remaining open to alternative viewpoints, fostering both critical thinking and academic ethics.

Nirṇaya (Reasoned Judgment): Culmination of Critical Thinking

Nirṇaya is the process of arriving at a well-founded conclusion after careful examination of evidence, arguments, and counterarguments. It represents the culmination of the Nyaya reasoning process.

In contemporary education, Nirṇaya corresponds to:

- reflective judgment,
- evidence-based decision-making,
- research conclusions,
- ethical reasoning,
- professional judgment.

Rather than making impulsive decisions, learners are encouraged to synthesize information, weigh alternatives, and justify their conclusions. This capacity is essential for researchers, teachers, administrators, and professionals working in complex environments.

NYAYA LOGIC AND CRITICAL THINKING: A CONCEPTUAL INTEGRATION

Critical thinking is widely recognised as a higher-order cognitive process that enables learners to analyse information, evaluate evidence, construct logical arguments, identify assumptions, and make reasoned decisions. Although different scholars define critical thinking in varied ways, there is broad consensus that it involves disciplined, reflective, and evidence-based thinking rather than the passive acceptance of information.

Contemporary higher education emphasises inquiry-based learning, problem-solving, analytical reasoning, collaborative dialogue, ethical decision-making, and reflective practice. Interestingly, these competencies are deeply embedded within the epistemological structure of Nyaya Logic. Rather than viewing Nyaya as merely a philosophical doctrine, it may be interpreted as a structured process of critical inquiry that guides learners from observation to rational judgment.

A comparative analysis reveals significant conceptual convergence between Nyaya principles and the cognitive dimensions of modern critical thinking.

Table 1 - Mapping Nyaya Logic with Critical Thinking Competencies

Nyaya Principle	Core Meaning	Critical Thinking Competency	Higher Education Application
Pratyakṣa	Direct perception	Observation and evidence collection	Laboratory work, field studies, classroom inquiry
Anumāna	Logical inference	Analytical reasoning	Research, hypothesis formation, interpretation of findings
Upamāna	Comparison	Analogical thinking	Case studies, comparative education, conceptual understanding
Śabda	Reliable testimony	Source evaluation	Academic reading, literature review, information literacy
Tarka	Logical reasoning	Problem-solving	Classroom discussions, inquiry-based learning
Hetvābhāsa	Logical fallacies	Error detection	Media literacy, argument evaluation, academic writing
Vāda	Rational dialogue	Collaborative reasoning	Debate, seminars, peer learning
Nirṇaya	Reasoned judgment	Reflective decision-making	Research conclusions, professional practice

Source - Author's Conceptual Framework (Developed

by the Author)

The table demonstrates that Nyaya Logic is not simply a philosophical system but a comprehensive framework for cultivating higher-order cognitive abilities. Each Nyaya principle corresponds to one or more competencies recognised within twenty-first-century education. Consequently, integrating Nyaya Logic into higher education can strengthen learners' capacity to think critically while simultaneously promoting India's indigenous intellectual traditions

PROPOSED NYAYA-BASED CRITICAL THINKING MODEL (NBCTM)

One of the principal contributions of this paper is the development of the **Nyaya-Based Critical Thinking Model (NBCTM)**. The model conceptualises critical thinking as a sequential process rooted in the epistemological principles of Nyaya philosophy.

Unlike conventional critical thinking models that primarily emphasise analytical reasoning, the proposed framework incorporates indigenous concepts of knowledge validation, reflective inquiry, logical debate, and ethical judgment.

The model consists of **eight interconnected stages**.

Observation (Pratyakṣa)

Critical thinking begins with careful observation of facts, experiences, or problems. Learners collect authentic information through direct engagement with reality rather than relying solely on assumptions.

Educational Practices

- Classroom observation
- Laboratory experiments
- Field visits
- Experiential learning

Evidence-Based Inference (Anumāna)

After collecting evidence, learners interpret observations and develop logical explanations supported by available evidence.

Educational Practices

- Data interpretation
- Research methodology
- Statistical reasoning
- Scientific investigation

Comparative Understanding (Upamāna)

Learners compare new information with existing knowledge, previous experiences, and analogous situations.

Educational Practices

- Comparative education
- Case analysis
- Concept mapping
- Analogical learning

Knowledge Validation (Śabda)

Students critically evaluate the credibility and reliability of academic sources before accepting knowledge claims.

Educational Practices

- Literature review
- Academic reading
- Source evaluation
- Information literacy

Logical Analysis (Tarka)

Learners systematically analyse arguments, test assumptions, and examine alternative explanations.

Educational Practices

- Inquiry-based learning
- Problem-solving
- Analytical discussions
- Research design

Fallacy Detection (Hetvābhāsa)

Fallacy Detection (Hetvābhāsa)

Students identify logical errors, cognitive biases, unsupported claims, and misleading arguments.

Educational Practices

- Media literacy
- Fake news analysis
- Critical reading
- Academic writing

Rational Dialogue (Vāda)

Learners refine their understanding through respectful academic discussion, collaborative inquiry, and evidence-based debate.

Educational Practices

- Seminars
- Group discussion
- Peer review
- Academic conferences

Reflective Judgment (Nirṇaya)

The final stage involves synthesising evidence and arguments to arrive at justified, ethical, and well-reasoned

conclusions.

Educational Practices

- Research conclusions
- Policy analysis
- Professional decision-making
- Reflective practice

EDUCATIONAL VALUE OF THE PROPOSED MODEL

The proposed NBCTM extends beyond philosophical interpretation by offering a practical pedagogical framework for higher education. It provides teachers with a structured approach to designing learning experiences that progressively develop observation, reasoning, evidence evaluation, dialogue, and reflective judgment. Unlike fragmented skill-based approaches, the model integrates cognitive, epistemological, and ethical dimensions of learning into a coherent sequence.

Furthermore, the framework aligns with the vision of **NEP 2020**, which advocates inquiry-based learning, multidisciplinary education, and the integration of Indian Knowledge Systems. By positioning Nyaya Logic as a living educational resource rather than a historical subject of study, the model demonstrates how indigenous philosophical traditions can contribute meaningfully to contemporary higher education.

PEDAGOGICAL IMPLICATIONS

The proposed **Nyaya-Based Critical Thinking Model (NBCTM)** has significant implications for higher education, particularly in the areas of curriculum design, teaching-learning processes, teacher education, assessment, educational research, and policy implementation. Rather than treating Nyaya Logic as a historical philosophical tradition, the model reinterprets it as a practical pedagogical framework that can cultivate critical, reflective, and ethical thinkers prepared for the demands of the twenty-first century.

Curriculum Development

The integration of Nyaya Logic into higher education curricula can enrich interdisciplinary learning by incorporating indigenous epistemological perspectives alongside contemporary theories of critical thinking. Courses in education, philosophy, social sciences, management, law, and teacher education may incorporate selected Nyaya concepts to strengthen students' reasoning abilities.

Embedding Nyaya principles within existing curricula can promote inquiry-based learning while supporting the objectives of multidisciplinary education envisioned in the

National Education Policy (NEP) 2020.

Teaching–Learning Process

The proposed framework encourages a shift from teacher-centred instruction to learner-centred inquiry. Faculty members can design classroom activities that move students systematically through observation, evidence collection, logical analysis, rational discussion, and reflective judgment.

Pedagogical strategies may include:

- inquiry-based learning,
- problem-based learning,
- Socratic and Nyaya-inspired questioning,
- structured debates,
- case-based teaching,
- collaborative learning,
- reflective writing,
- research projects.

Such practices encourage active knowledge construction rather than passive memorisation.

Teacher Education

Teacher education programmes can benefit substantially from the proposed framework. Future teachers require not only subject knowledge but also the ability to guide learners in analysing evidence, evaluating arguments, and engaging in reflective dialogue.

Integrating Nyaya Logic into pre-service and in-service teacher education may strengthen:

- pedagogical reasoning,
- classroom questioning techniques,
- reflective teaching,
- academic discussion,
- assessment literacy,
- ethical decision-making.

Consequently, teachers become facilitators of inquiry rather than transmitters of information.

Research Competencies

Research in higher education fundamentally depends upon observation, evidence evaluation, logical inference, and rational interpretation—all central principles within Nyaya philosophy.

The proposed framework may strengthen students' abilities to:

- formulate research questions,
- evaluate literature critically,

- distinguish evidence from opinion,
- identify methodological weaknesses,
- avoid faulty reasoning,
- interpret findings objectively.

These competencies contribute directly to the development of research culture within universities.

Digital and Media Literacy

The contemporary digital environment presents learners with enormous quantities of information, misinformation, and AI-generated content. Nyaya's emphasis on **Śabda** (credible testimony) and **Hetvābhāsa** (recognition of fallacious reasoning) provides valuable tools for evaluating information critically.

Within digital education, the framework can support:

- source verification,
- fake news identification,
- evidence-based online research,
- responsible use of AI tools,
- ethical information practices.

Thus, Nyaya Logic remains highly relevant in the digital knowledge economy.

Assessment Practices

Assessment can move beyond factual recall to evaluate students' reasoning processes.

Examples include:

- argument analysis,
- reflective essays,
- case-based assessment,
- structured debates,
- research critiques,
- problem-solving tasks,
- evidence evaluation exercises.

Such assessments better reflect higher-order learning outcomes than traditional memory-based examinations.

LIMITATIONS OF THE STUDY

Although the proposed framework offers a comprehensive conceptual integration of Nyaya Logic and critical thinking, several limitations should be acknowledged.

First, the study is conceptual and relies exclusively on secondary sources. The proposed model has not been empirically tested in higher education classrooms.

Second, the interpretation of classical Nyaya concepts within modern educational contexts involves philosophical adaptation. Alternative interpretations may be possible

depending upon different schools of Indian philosophy and educational theory.

Third, the framework has been developed primarily with reference to higher education institutions. Its applicability to school education, vocational education, or professional training requires separate investigation.

Finally, the effectiveness of the proposed model may vary across cultural, institutional, and disciplinary contexts. Future empirical studies are necessary to evaluate its practical implementation and educational outcomes.

FUTURE RESEARCH DIRECTIONS

The present study provides several opportunities for future research.

Future investigations may:

- empirically validate the Nyaya-Based Critical Thinking Model among university students;
- compare the effectiveness of Nyaya-based pedagogy with established critical thinking frameworks;
- develop standardised instruments to assess Nyaya-inspired critical thinking competencies;
- examine the role of Nyaya Logic in teacher education programmes;
- explore its application in online, blended, and AI-supported learning environments;
- investigate interdisciplinary applications in law, management, health sciences, and STEM education.

Such studies would strengthen the evidence base for integrating Indian Knowledge Systems into higher education.

CONCLUSION

Critical thinking has become an indispensable educational goal in contemporary higher education. Rapid technological advancement, increasing information complexity, and the growing need for ethical and evidence-based decision-making require learners who can observe carefully, reason systematically, evaluate evidence critically, and engage in constructive dialogue. While existing critical thinking frameworks have made significant contributions, the intellectual traditions of the Indian Knowledge System offer complementary perspectives that remain underutilised within modern educational practice.

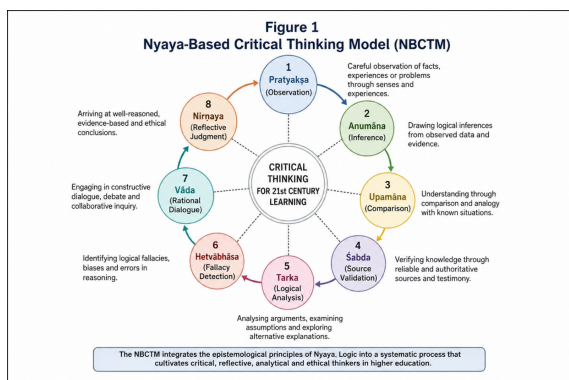
This paper examined Nyaya Logic as a philosophical and pedagogical framework for cultivating critical thinking in higher education. Through a conceptual analysis of Nyaya principles—including Pratyakṣa, Anumāna, Upamāna, Śabda, Tarka, Hetvābhāsa, Vāda, and Nirṇaya—the study

demonstrated their close correspondence with contemporary competencies such as observation, analytical reasoning, source evaluation, argument analysis, collaborative inquiry, and reflective judgment.

A major contribution of the study is the development of the Nyaya-Based Critical Thinking Model (NBCTM), which reinterprets classical Nyaya epistemology as a sequential pedagogical framework for twenty-first-century learning. The model provides a structured pathway from evidence gathering to reflective decision-making and highlights how indigenous philosophical traditions can enrich curriculum design, teaching-learning processes, assessment, research training, and teacher education.

The proposed framework also aligns with the broader objectives of the National Education Policy 2020, particularly its emphasis on inquiry-based learning, multidisciplinary education, holistic development, and the integration of Indian Knowledge Systems. By positioning Nyaya Logic as a living educational resource rather than merely a historical philosophical system, the study contributes to ongoing discussions on decolonising knowledge, promoting epistemic diversity, and strengthening indigenous perspectives within higher education.

Although conceptual in nature, the study establishes a theoretical foundation for future empirical research. Further validation across institutional contexts, academic disciplines, and learner populations will be essential to determine the educational effectiveness of the proposed framework. Nevertheless, the paper argues that Nyaya Logic possesses considerable potential to enrich contemporary critical thinking pedagogy while reaffirming the continuing relevance of India's philosophical heritage in addressing present-day educational challenge



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