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DECONSTRUCTING THE AI TEACHER: ASSESSING EDTECH PERSONALIZATION THROUGH THE LENS OF PANCHA KOSHA HOLISTIC EDUCATION

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RESEARCH ARTICLE

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Abstract

The rapid expansion of AI-driven educational technologies has strengthened the view that learning can be improved through personalization and efficient knowledge delivery. This paper examines that assumption through the Upanishadic concept of Pancha Kosha, which understands education as the development of the whole person across interconnected physical, vital, mental, intellectual, and spiritual dimensions. While contemporary educational technologies can support knowledge acquisition and cognitive performance, their operation remains largely confined to the Manomaya Kosha, the domain of mental processing. Through an examination of Intelligent Tutoring Systems, Large Language Models, and recent developments in educational technology, the paper explores the limits of algorithmic instruction when viewed against a broader conception of human development. It argues that education involves forms of growth that extend beyond information processing, including discernment, embodied experience, and ethical reflection. The Pancha Kosha framework offers a lens through which the capacities and limitations of AI-based instruction may be evaluated.

Keywords: *Educational Technology; Algorithmic Instruction; Pancha Kosha; Holistic Education; Cognitive Optimization; Moral Development; Indian Educational Philosophy*

Introduction

A student who struggles in the process of learning is meant to receive additional support; and the one who progresses quickly is supposed to move ahead. Contemporary educational technologies promise to make such adjustments automatically by responding to patterns in student performance. Much of the appeal of AI in education rests on this idea of personalization, and this understanding of education is closely tied to measurable indicators of performance. Progress is tracked through completed tasks, assessment scores, response times, and other forms of data generated during the learning process. Such information can reveal important aspects of a student's academic development.

At the same time, it raises a broader question. Does education consist primarily of those dimensions of learning that can be recorded, quantified, and optimized? The Pancha Kosha model described in the Taittiriya Upanishad approaches this question from a different direction. Human development is understood through five interconnected koshas (sheaths): Annamaya (the physical body), Pranamaya (vital energy), Manomaya (the mind), Vijnanamaya (discriminative understanding), and Anandamaya (inner fulfilment). These koshas are not treated as isolated compartments. Together they describe different dimensions of human experience and growth. Learning, within this framework, extends beyond the acquisition of knowledge and involves the development of the learner across all five dimensions. This perspective introduces a different set of concerns into contemporary discussions of educational technology.

AI systems can support memory, comprehension, and information processing with remarkable efficiency. Their operation corresponds most closely to the Manomaya Kosha, where knowledge acquisition and cognitive activity are central. The remaining koshas draw attention to dimensions of learning that are less easily represented through data. Questions of physical well-being, emotional regulation, discernment, and fulfilment remain integral to education even when learning environments become increasingly automated. The relationship between these dimensions and the growing role of algorithmic instruction forms the focus of this study.

The Pancha Kosha Framework: Dimensions of Human Development

To understand the limitations of automated instruction, it is necessary to ask a prior question: what constitutes a complete human learner? Much of contemporary educational practice places cognitive development at the centre of the learning process. The Indian Knowledge System (IKS) approaches the question differently. One of its most influential formulations appears in the Taittiriya Upanishad as the Pancha Kosha framework (Chapagain, 2025) [1]. Human development is described through five interconnected koshas or sheaths, each contributing to the formation of the individual and each carrying educational significance (Roy, 2026) [2].

The Pancha Kosha framework begins with the Annamaya Kosha. It concerns the physical dimension of human existence. Within this understanding, the learner is never reduced to a thinking mind detached from the body. Health, posture, nutrition, physical discipline, and bodily well-being all shape the educational experience; as the act of paying attention, as well as the motivation to learn, both become difficult to sustain, when the body is exhausted, tensed or not properly in shape. The condition of the body therefore becomes an educational concern in its own right.

Alongside it stands the Pranamaya Kosha, the sheath of vital energy. Breath, motivation, emotional balance, and vitality are located within this domain. The two are closely connected. Together they establish the physical and energetic conditions within which learning takes place. The Manomaya Kosha refers to the mental domain of learning. Memory, perception, thought, and the organisation of experience operate within this sheath. Contemporary educational systems devote considerable attention to these capacities through reading, assessment, practice, and repetition. Yet the Pancha Kosha framework does not stop at cognition. The Vijnanamaya Kosha introduces the capacity for discernment. Information may be acquired through study, but understanding requires evaluation, interpretation, and judgment. Questions concerning meaning, application, and ethical consequence belong to this dimension of development.

The final sheath is the Anandamaya Kosha. It is associated with fulfilment, integration, and a deeper sense of meaning. In educational terms, this dimension becomes visible when learning contributes to self-understanding and personal growth. Academic achievement alone does not necessarily produce such experiences. A learner may perform well in examinations and still feel detached from what they study. The Anandamaya Kosha draws attention to a dimension of education that extends beyond performance and attainment.

These ideas become easier to understand when viewed through educational practice. In the Guru-Shishya tradition, teaching is not confined to the transmission of information. The teacher observes, guides, corrects, and responds to the learner as a whole person. Physical fatigue, restlessness, anxiety, and disengagement are not treated as concerns separate from learning. They form part of the educational process itself. The Annamaya and Pranamaya Koshas therefore remain active concerns within the learning environment rather than abstract philosophical categories.

The importance of the Vijnanamaya Kosha becomes particularly visible in situations where knowledge alone is insufficient. Students encounter disagreement, uncertainty, competing interpretations, and questions that do not yield simple answers. The educator helps them navigate these situations through discussion, reflection, and example. Knowledge acquires significance when learners begin to evaluate and apply it rather than merely retain it. Education therefore includes the cultivation of judgment alongside the acquisition of information.

The continuing relevance of these ideas can be seen in India's National Education Policy (NEP) 2020 and the subsequent National Curriculum Frameworks. These documents draw upon the Pancha Kosha model in their understanding of learner development (Ministry of Education, 2022) [3]. Physical well-being, emotional balance, ethical awareness, and intellectual growth appear together within this vision of education. The presence of the framework within contemporary educational policy reflects a conception of learning that extends beyond cognitive attainment alone. It also provides a useful basis for examining the extent to which AI-mediated forms of instruction can engage the broader aims of education.

The Mechanics of Algorithmic Instruction

Personalization occupies a central place in contemporary discussions of educational technology. Learners tend to progress at different rates, make different mistakes, and consequently, require different forms of support. Intelligent Tutoring Systems (ITS) attempt to respond to these differences by continuously modelling student performance and adjusting instructional content. To understand what such systems actually personalize, it is necessary to examine how they construct and update their understanding of a learner. Much of this process relies on probabilistic models such as Bayesian Knowledge Tracing (BKT) and Deep Knowledge Tracing (DKT).

BKT estimates the likelihood that a learner has mastered a particular skill by analysing patterns of correct and incorrect responses over time. DKT extends this approach through neural networks capable of identifying more complex relationships within a student's learning history. Despite their technical differences, both models pursue the same objective: constructing a mathematical representation of what a learner is likely to know at a given moment and updating that estimate as new data becomes available. Within these systems, the learner appears as a changing set of probabilities associated with particular knowledge states rather than as a complete human subject (Holmes & Tuomi, 2022) [4]. Keystrokes, cursor movements, semantic keywords, and patterns of error become the raw material through which the system estimates what a student knows.

The operation of these systems becomes clearer through a simple example. Imagine a student working through a physics lesson on kinematics. An incorrect variable is entered. The student pauses for ninety seconds before deleting the equation and attempting

another approach. For the learner, that interval may contain uncertainty, reflection, frustration, concentration, or distraction. For the system, it appears as a series of measurable events. An error has occurred. Progress has slowed. A delay has been recorded. Drawing upon patterns identified across previous users, the platform concludes that the learner has encountered a difficulty and responds with a scaffolded hint.

The algorithm has no access to what is happening beyond the data it receives. It cannot determine whether the ninety-second pause reflects a moment of sustained concentration or the onset of anxiety accompanied by shallow breathing (Pranamaya Kosha). It cannot observe a student's posture collapsing from fatigue (Annamaya Kosha). The system records a delay, processes the signal, and delivers a programmed response. Its intervention is guided by a reinforcement-learning objective designed to move the learner from an incorrect answer to a correct one as efficiently as possible.

The integration of Large Language Models (LLMs) into educational technology extends this process without altering its basic logic. When an AI tutor generates a message such as, "I see you are struggling with this concept, let's try another way," the response is produced through next-token prediction based on patterns in its training data (Williamson & Eynon, 2020) [5]. Even affective computing tools that attempt to infer emotional states through facial analysis or keystroke patterns operate by mapping observable signals onto predefined categories such as frustration or engagement (Cukurova et al., 2023) [6].

The educational possibilities available to the system are constrained by the information it can collect and process. Because AI depends on measurable inputs, learning is interpreted through indicators that can be recorded, quantified, and evaluated. Experiences that cannot be translated into data remain outside the system's field of awareness. The result is a model of education centred on the assessment and optimisation of cognitive performance.

Subordinating the Algorithm: A Symbiotic Model for Holistic Pedagogy

For much of modern educational history, the teacher has occupied a role that combines responsibilities of very different kinds. Some belong to the transmission of knowledge: explaining concepts, answering questions, correcting misunderstandings, and evaluating progress. Others emerge from the social and human realities of the classroom itself. A teacher notices when discussion collapses into confusion, when confidence gives way to frustration, or when a student who was previously engaged begins to withdraw. Artificial intelligence has altered part of this arrangement. Certain instructional functions that once demanded considerable time and repetition can now be performed by digital systems. Other aspects of teaching remain difficult to separate from human presence and judgment.

Large Language Models can explain concepts, adaptive platforms can recognise recurring patterns of error, and spaced-repetition systems can revisit material with a consistency that no individual teacher could realistically maintain across hundreds of learners. Their educational value is therefore genuine. Explanation, revision, practice, and reinforcement have always occupied a substantial portion of formal education. In many contexts, AI systems can assist with these tasks effectively. The growing presence of such technologies in education reflects a practical capability rather than a technological novelty.

Yet the success of education has never depended solely upon the successful delivery of content. Teachers frequently respond to conditions that do not appear in assessment results or learning analytics. A lesson that works exceptionally well with one group may fail with another despite identical content and identical objectives. The difference often lies in factors that resist straightforward measurement. Educational technologies can identify patterns within performance data. They remain dependent upon what that data is capable of capturing.

A student may spend forty minutes working through an adaptive module on cellular biology and answer every question correctly. The platform records progress and updates its estimate of mastery. From the perspective of the system, the learning objective has been achieved. The teacher confronts a broader picture. Correct answers reveal that a student has arrived at the expected response. They reveal far less about the experience through which that response was produced. A learner may understand the material and still struggle to sustain attention, maintain interest, or remain meaningfully engaged with the task. Under such circumstances, additional content may contribute little. A discussion, practical activity, collaborative exercise, or a temporary shift in pace may prove more educational than another sequence of questions.

The relevance of the Vijnanamaya Kosha becomes clearer once education moves beyond the communication of established knowledge. Many of the questions students encounter do not yield themselves to definitive answers. Historical evidence supports competing interpretations. Political decisions invite disagreement. Ethical questions persist even after the available facts have been established. At this point, the educational task changes in character. Students are no longer being asked simply to know. They are being asked to judge. They must evaluate claims, recognise assumptions, weigh alternatives, and consider consequences. Such capacities develop gradually through reflection and engagement with complexity.

History and civic education make this distinction particularly visible. An AI tutor can efficiently provide dates, statistics, historical context, and factual information. Yet the central educational questions often begin after those facts have been introduced. Why should a particular event be interpreted in one way rather than another? Which voices are represented within a historical account, and which remain absent? How should responsibility be assigned in situations involving competing interests and conflicting evidence? Students learn to engage with these questions primarily through discussion, disagreement, and critical examination of competing viewpoints. A learner may satisfy every requirement established by an educational platform and still feel strangely untouched by the experience. Progress has been recorded, objectives have been completed, and performance

indicators continue to improve. Yet the question of meaning remains unresolved. It is precisely this dimension of education that the Anandamaya Kosha brings into focus.

This distinction returns us to the central argument of the Pancha Kosha framework. Certain educational tasks can be assisted by artificial intelligence with considerable success. Others remain inseparable from the human dimensions of learning discussed throughout this paper. The role of the educator is not diminished by this arrangement; in many respects, it becomes more important. As access to information becomes easier, questions of judgment, interpretation, meaning, and self-understanding acquire greater significance. The value of educational technology therefore lies not in replacing the teacher, but in creating greater space for those aspects of education that no algorithm can cultivate on its own.

Conclusion

A student can complete an adaptive lesson, receive immediate feedback, improve performance scores, and retain more information than before. By many contemporary measures, such an outcome would be considered educational success. The Pancha Kosha framework directs attention towards dimensions of development that extend beyond the acquisition of knowledge. Physical well-being, emotional balance, discernment, relationships, and the search for meaning remain part of the educational experience even when they resist measurement.

For this reason, the question facing contemporary education is not whether artificial intelligence should be used in the classroom. The technology is already present and, in many contexts, genuinely useful. The more important question concerns the role it should occupy. AI can assist with explanation, revision, practice, and other tasks that traditionally consume substantial amounts of instructional time. When used in this manner, it has the potential to support learning while allowing teachers to devote greater attention to aspects of education that cannot be delegated so easily.

Information can now be accessed, organised, and reproduced with unprecedented speed. The educational significance of a teacher therefore lies increasingly elsewhere. Students still need human teachers, who can recognise the difference between arriving at an answer and understanding how it changes the way one sees a problem. The future challenge for education may not be building more capable learning technologies. It may be retaining a sufficiently rich understanding of the learner. Once that understanding is reduced, the machine no longer needs to become more human. What changes is the conception of education against which it is measured.

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