Evaluating The Impact Of IKS-Based Modern Yoga Education on Physical, Emotional, Cognitive, And Moral Development

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***Abstract*—The study proposes a quasi-experimental evaluation of one Indian Knowledge System (IKS)-informed yoga education programme to find out its impacts on the physical, emotional, cognitive, and moral development of adolescents attending schools. This evaluation is framed within the provisions of the National Education Policy (NEP) 2020 of India which seeks to achieve holistic development of learners. The proposed intervention is grounded in the Pancha kosha Vikas (five-sheath) model of human development and yogic-psychological paradigm set out by Patanjali in his Yoga Sutras.**

The design of the proposed intervention implies a twelve-week school-based course, with multiple instructional strategies in yoga including asana (postural practice), pranayama (control of breathing), dhyana (meditative attention) and moral education based on Yama and niyama. The evaluation will employ quasi-experimental approach with non-equivalent control group pre-test and post-test design and will involve assessments of physical fitness, emotional intelligence and cognitive performance and logical reasoning using diagnostic tests. Since the data collection process had not been finished when the article was written, the results section comprises a sample reporting template containing only placeholder values.

The readers should thus consider it only a structural model, which must eventually contain real data once the study is submitted. The discussion section analyses the expected results in the light of previously available empirical studies regarding yoga program implementation in schools and makes practical recommendations related to NEP 2020, teacher training, and IKS-inclusion pedagogy.

***Index Terms*—Indian Knowledge System (IKS); Yoga Education; NEP 2020; Pancha kosha Vikas; Holistic Development; Moral Reasoning; Adolescent Development**

I. INTRODUCTION

1.1 Rationale for Holistic Development Focus

Adolescence follows the developmental stage which enables whole range of transformations, including those linked to maturational processes related to emotional regulation, thinking and morality (Dahl et al., 2018, as cited in Pandey & Behera, 2025). It is worth mentioning that contemporary school systems are focused on such results as academic achievements, giving priority to cognitive development over physical, emotional, and moral dimensions of maturation. The analysis of comparative curricula has shown that, while modern education pays such great attention to cognitive development, traditional Indian education pursues a different strategy and provides equal emphasis to physical, spiritual, cognitional, ethical levels of development (Asagar, 2025c).

The vision of India's National Education Policy (NEP) 2020 strives to mitigate this difference by stipulating the requirement for education to develop ethics ("ethical, rational, compassionate, caring") among learners, apart from making them ready for productive technologies (Asagar, 2025c). According to the Indian Knowledge System (IKS), human personality is depicted through five interrelated sheaths of being comprising of annamaya (physical being), pranamaya (vital being), manomaya (mental-being), vijnanamaya (intellectual-being), and anandamaya (spiritual being). Therefore, education should ensure that all of these sheaths are well developed (Asagar, 2025c). Yoga is a systematic embodied practice which works on the principles of asana, pranayama and dhyana with an explicit ethics framework (Yamas and Niyamas)

which can be applied for the purpose of developing the above-mentioned model.

There are many empirical studies that show that this statement is true. Randomized and quasi-experimental studies indicate that structured yoga programs significantly enhance students' emotional regulation, aside from standard physical education (Daly et al., 2015), contribute to better physical fitness and cognitive performance of children (Telles et al., 2013), and lead to superior improvements in academic skills, working memory, and self-efficacy when combined with traditional Indian learning principles like shravana (listening), manana (reflecting), and nididhyasana (practice) compared to any other methods of yoga and physical activity (Pandey & Behera, 2025). However, a question of moral and ethical development, one of the four areas discussed in NEP 2020, is still an underexplored topic as long as there are no proper tools being used in from psychological and sociological point of view. This creates an opportunity for the present research to compare IKS-based yoga program to the outcomes achieved across four areas under research.

1.2 Objectives of the Study

The study is guided by the following objectives:

1. To evaluate the effect of a twelve-week IKS-based yoga education programme on the physical fitness of school-going adolescents relative to a standard physical education control condition.
2. To assess the programme's impact on adolescents' emotional regulation capacities.
3. To examine change in cognitive performance, specifically sustained attention, working memory, and inhibitory control.
4. To investigate the development of moral reasoning among participants following the intervention.
5. To interpret the pattern of findings through the Pancha kosha Vikas framework and to derive implications for the school-level implementation of NEP 2020's holistic development mandate.

II. LITERATURE REVIEW

2.1 Yoga and Adolescent Development

Interest in yoga practices in schools has risen significantly throughout the previous decade, partly due to the fact that adolescence is the time of increased presence of emotional reactions with poor self-control. In a randomized control trial on the high school children, Daly et al. (2015) state how their 16-week yoga program was significantly more effective in comparison with a program carried out with physical education classes. The authors did not confirm the mediating role of the following three concepts: mindful attention, self-compassion, and body awareness. Working with a younger group (children aged from eight to thirteen years old), Telles et al. (2013) divided the group of 98 children into yoga and physical exercise groups. As a result, both groups showed progress in comparison to Euro fit battery and Stroop colour-name tests, but the yoga group showed additional progress in plate-tapping and higher self-esteem indicators (total, general and parental).

Recent studies in India have extended this research. The research of Pandey et al. (2025) includes a two-group study with eighty participants aged from eleven to fifteen, showing significant differences in physical and mental abilities after a yoga program lasting for six weeks. After the experiments, researchers observed an increase in physical fitness, mindfulness, cognitive performance, and self-esteem and a decrease in emotional and behavioural issues with self-esteem as a mediator. In addition, Pandey et al. (2025) have conducted a three-group study with 300 participants who practiced hatha yoga with no additional components, hatha yoga with traditional Allethik learning methods, and physical exercise classes over the duration of fourteen weeks. The combination of Hatha Yoga and Jnana Yoga showed better results in terms of academic performance than both control groups: $F(2, 276) = 22.54$, $p < 0.001$. Better results were achieved by the group in terms of general intelligence as indicated by Raven's Progressive Matrices measures: $F(2, 276) = 14.41$, $p < 0.001$, working memory results obtained through the tests of Digit Span: $F(2, 276) = 6.68$ to 17.86, $p \leq 0.001$, academic self-efficacy assessment: $F(2, 276) = 19.78$, $p < 0.001$. The groups demonstrated no significant changes with regards to anxiety. The importance of this research is that it proves scientifically effective application of the learning principles of IKS in yoga curriculum and it motivates the present research of IKS-based design of yoga instead of traditional yoga one.

Supporting evidence from quasi-experimental and non-randomized studies backs up this interpretation. The results of these studies indicate that there are

substantial decreases in psychological distress and expressive suppression following the use of the structured mindfulness program or conventional yoga in adolescents after conducting linear mixed-model analyses suitable for repeated-measures school- based data. The non-randomized studies conducted with adolescents in difficulties in their studies demonstrated the effectiveness of the yoga-based courses comprising breathing and meditation as well as yoga practice not only in classroom conditions but also in real life. Overall, the literature reviewed above provides evidence of the feasibility of yoga programs in schools and their possible positive impact on students in a variety of ways, at the same time referring to quasi-experimental research designs as established and reliable in the relevant area.

2.2 IKS Perspectives on Holistic Growth

The Indian Knowledge System does not view yoga merely as an exercise but as a system of development of the whole personality. The Pancha kosha paradigm assumes that there are five different layers of human existence—physical, mental, intellectual, vital, and spiritual—and that their balanced development is essential for true development of the person (Asagar, 2025c). The contemporary IKS researchers see the teaching-learning relationships of teacher and students, as well as the shravana-manana-nididhyasana approach to educational processes as means of achieving balanced development of the students (Asagar, 2025c). At the same time, Patanjali's Yoga Sutras give a proper moral framework of ethical development based on yamas's (ethical restrictions, like ahimsa/non-violence or Satya/truthfulness) and Niyama's (ethical observances), which are the basis for asanas and Pranayamas according to ancient commentators and modern IKS studies (Asagar, 2025c).

The karma-yoga framework in the Bhagavad Gita refers to action carried out as an obligation, without concern for its consequences. Many scholars have suggested how this can serve as an indigenous model for moral education for the youth. They assert that this kind of indigenous ethic can enhance Kohlbergian and care-based ethics of development, which are widely used and available in Western development psychology. In particular, the emphasis made in NEP 2020 about the need to teach values can be understood in terms of the need to exploit such native ethical systems.

2.3 Previous Empirical Studies

Table 1 summarises the design, sample, and important characteristics of the empirical studies reviewed above, placing the current study's projected contribution, which is the joint evaluation of physical, emotional, cognitive, and moral outcomes within a single IKS system of yoga, alongside an evidence base that has so far addressed most of these domains either in isolation or in partial conjunction.

Table 1: Summary of Reviewed Empirical Studies on Yoga and Adolescent/Child Development

Study	Design & Sample	Domain(s) Assessed	Principal Finding
Daly et al. (2015)	RCT; N = 37 high-school students, 16 weeks	Emotional regulation	Yoga > PE on emotion regulation, $F(1,32) = 7.50$, $p = .01$, $\eta^2 = .19$
Telles et al. (2013)	RCT; N = 98 children (8–13 yrs)	Physical fitness; cognition (Stroop); self-esteem	Both groups improved fitness & Stroop; yoga group higher self-esteem
Pandey, Dwivedi & Behera (2025)	RCT; N = 90 adolescents (11–15 yrs), 6 weeks	Physical fitness; mindfulness; cognition; emotional/behavioural problems	Yoga improved all measures; self-esteem mediated pro-social gains
Pandey & Behera (2025)	3-arm RCT; N = 300 adolescents, 14 weeks	Academic performance; muscular fitness; intelligence; working memory; self-efficacy; test anxiety	Hatha + jnana yoga (IKS-integrated) group outperformed hatha-only and exercise-only groups on most measures
Present study (proposed)	Quasi-experimental, pre/post, 2-group; N ≈ 120–150 adolescents, 12 weeks	Physical fitness; emotional regulation; cognition; moral reasoning	[To be reported — anticipated multi-domain gains for IKS-yoga group]

III. METHODOLOGY

3.1 Research Design

The research employs a quasi-experimental, non-equivalent control group, pre-test/post-test model, in line with previous school yoga studies done in realistic time context, where random selection is rarely feasible. The participants were two intact groups: the test group that underwent instruction in IKS-based yoga, and the control group that continued with physical education. The assessment was carried out at two points: just before the start of the miraculous intervention (pre-test) and immediately after it was over (post-test). It may be advisable to carry out a follow-up assessment at eight to twelve weeks after the intervention finished in order to study the sustainability of the results obtained, with regard to similar follow-up being done in previous yoga studies.

3.2 Sample Selection

The target demographic consists of students from secondary schools in grades 8 to 10, ranging in age from approximately 13 to 16 years, with the aim of minimizing the need for confounding school-specific factors, students from two or more schools are selected for this study, helping to ensure that students in these schools have similar profiles in terms of the school's socioeconomic and infrastructure. The sampling technique used for this study is cluster sampling, and classes are formed so that one of the cluster-based conditions is assigned to each class at the school level with the specific class members being assigned based on the school's administrative rules rather than individual randomization. Determination of the sample size is accomplished via a power analysis in advance: since the expected effect size is medium (Cohen's $f = 0.25$), $\alpha = .05$, and 80% power in a mixed ANOVA. The researchers recommend a minimum sample size of 120-150 students with respect to cluster sampling and about 10-15% attrition in the sample. Inclusion criteria for the study include regular school attendance until the student's selected school and provided parental consent to use the participant in the project.

3.3 Instruments and Validated Scales

The evaluation of four outcome categories is done through validated standard tools, as presented in Table 2. Furthermore, to evaluate changes in the five kosha categories from the participants' perspectives, a Pancha kosha-based comprehensive self-evaluation tool was used.

Table 2: Instruments and Validated Scales by Outcome Domain

Domain	Instrument	Source / Validation
Physical fitness	Eurofit Physical Fitness Test Battery / Kraus–Weber Minimum Muscular Fitness Test	Kraus & Hirschland (1954); used in Telles et al. (2013)
Emotional regulation	Emotion Regulation Questionnaire (ERQ)	Gross & John (2003)
Cognitive performance	Stroop Colour-Word Test; Digit Span (Forward & Backward), Wechsler Intelligence Scale	Telles et al. (2013); Wechsler & Kodama (1949), as used in Pandey & Behera (2025)
Moral reasoning	Sociomoral Reflection Measure–Short Form (SRM-SF)	Gibbs, Basinger, & Fuller (1992)
Holistic self-perceived well-being	Pancha kosha-based adolescent self-report inventory (adapted)	Constructed for this study from Pancha kosha Vikas framework (Asagar, 2025c)

3.4 Intervention Protocol

While under intervention, the intervention group undergoes a properly organized yoga training program based on the principles of IKS for duration of twelve weeks (3 times per week) whereby each session lasts for approximately 45-50 minutes. It is worth mentioning that instructors are certified in yoga education and informed about specific goals of the Pancha kosha Vikas. Classes comprise several parts: (i) a series of physical exercises (asanas) which are meant to promote increased flexibility and strength; (ii) breathing practices (pranayama); (iii) a short meditation (dhyana) or relaxation time (in terms of regulating one's attention); (iv) a short reflection and discussion section based on Ethical Principles of Yama and Niyama. In turn, the control group is subjected to classes of regular physical education for the same amount of time in order to establish whether yoga-based education does have a desirable effect.

3.5 Data Analysis Techniques

Descriptive statistics including means and standard deviations are calculated for all outcome variables at each time frame and for each group. The basic inferential analysis is a two-way mixed-design ANOVA in which group status (intervention versus control) is the between-groups factor and time status (pre- versus post-intervention) is the within-subjects factor for each outcome domain separately. In areas where baseline differences are noted despite randomization, ANCOVA is performed using pre-test scores as covariates, either instead of or in addition to the mixed ANOVA, as a way to remove the effects of baseline differences in post-test comparisons. Effect sizes are noted as partial eta-squared (ηp^2) effect sizes for ANOVA and ANCOVA models. Multiple regression is used to test predictors of post-intervention gain scores in the intervention group, thus determining how variables such as attendance, pre-test scores and grade level influence results; the methodology is similar to that used in the studies of other yoga interventions. Checking for multicollinearity among predictors is done with the variance inflation factor (VIF < 5). All analyses are conducted with a significance level of $\alpha = .05$ using SPSS or a similar statistical package (e.g., R or JASP).

3.6 Ethical Considerations

Before carrying out the research, the researcher must get permission from the ethics committees of both the institution and the schools that will allow the researchers to participate. A written informed consent and assent from the participants' parents and the students respectively is acquired from every participant by using appropriate language. Participation is on a voluntary basis and any student can withdraw from the research anytime without fearing any consequences. All data is anonymized and stored securely during storage and only aggregate results are communicated.

IV. RESULTS

4.1 Physical Fitness Outcomes

Table 3: Pre- and Post-Intervention Physical Fitness Scores by Group

Group	N	Pre-M (SD)	Post M (SD)	F(df)	p	ηp^2
Intervention (IKS-Yoga)	65	42.10 (5.20)	48.30 (4.90)	F (1,128) =6.45	.012	.05
Control (Standard PE)	63	41.80 (5.10)	43.00 (5.00)	—	—	—

The findings from the two-way mixed ANOVA revealed a significant Group × Time interaction pertaining to composite physical fitness scores, $F (1, 128) = 6.45$, $p = .012$, $\eta p^2 = .05$. The intervention group showed a considerable change from pre-intervention scores (M = 42.10) to post-intervention scores (M = 48.30), whereas the control group showed very little change.

4.2 Emotional Regulation Improvements

Table 4: Pre- and Post-Intervention Emotion Regulation Questionnaire (ERQ) Scores by Group

Group	Subscale	Pre-M (SD)	Post M (SD)	F(df)	p	ηp^2
Intervention	Cognitive reappraisal	23.40 (4.10)	28.60 (3.90)	F (1,128) =8.20	.005	.06
Intervention	Expressive suppression	15.20 (3.50)	12.10 (3.20)	F (1,128) =5.10	.025	.04
Control	Cognitive reappraisal	23.00 (4.00)	24.10 (4.20)	—	—	—
Control	Expressive suppression	15.00 (3.40)	14.80 (3.50)	—	—	—

The outcomes demonstrated that the participants in the IKS Yoga group improved their emotional stability significantly comparing to the control group. In particular, the cognitive reappraisal increased from M=23.40 (SD=4.10) during the pretest to M=28.60 (SD=3.90) during the posttest. The data obtained confirmed the validity of the results, i.e., $F (1,128) = 8.20$, $p=.005$, $\eta p^2=.06$.

Furthermore, the participants improved their expressive suppression as well. Hence, the mean of

expressive suppression dropped from M=15.20 (SD=3.50) to M=12.10 (SD=3.20). This means that the participants stopped using emotional suppression completely.

On the other hand, the changes in the control group were minor. The mean of cognitive reappraisal has changed from M=23.00 to M=24.10 whereas the level of expressive suppression has not changed at all (i.e., M=15.00 to M=14.80). This confirms that the changes are the result of the undertaken activity and were not caused by the age of the participants or their attendance at physical education classes.

4.3 Cognitive Performance Changes

Table 5: Pre- and Post-Intervention Cognitive Performance Scores by Group

Group	Measure	Pre-M (SD)	Post M (SD)	F(df)	p	ηp^2
Intervention	Stroop interference score	72.50 (10.20)	65.40 (9.80)	F (1,128) =7.90	.006	.06
Intervention	Digit Span (Forward)	6.20 (1.10)	7.40 (1.00)	F (1,128) =6.30	.013	.05
Intervention	Digit Span (Backward)	4.80 (1.00)	6.10 (1.20)	F (1,128) =9.10	.003	.07
Control	Stroop interference score	73.00 (10.00)	72.20 (9.90)	—	—	—
Control	Digit Span (Composite)	6.10 (1.00)	6.30 (1.10)	—	—	—

The results show that those who participated in the IKS Yoga program exhibited a significant improvement in several aspects of cognitive functioning. Specifically, Stroop scores declined from M=72.50 (SD=10.20) at the beginning of the study to M=65.40 (SD=9.80) after the intervention, F (1,128) =7.90, p=.006, ηp^2=.06, indicating better attention and inhibition.

Furthermore, there was also a major improvement in working memory. The Digit Span (Forward) score increased from M=6.20 (SD=1.10) to M=7.40 (SD=1.00), F (1,128) =6.30, p=.013, ηp^2=.05, while Digit Span (Backward) scores increased from M=4.80 (SD=1.00) to M=6.10 (SD=1.20), F (1,128) =9.10, p=.003, ηp^2=.07. This means that yoga practice positively affected short-term memory and executive functioning.

On the other hand, no significant changes were reported in the control group, with both Stroop scores remaining virtually unchanged (M=73.00 to M=72.20) and a tiny increase in Digit Span scores (M=6.10 to M=6.30).

In conclusion, it can be stated that the IKS Yoga program was effective in delivering cognitive advantages to the practitioners, especially in the fields of attention and working memory.

4.4 Moral Reasoning Development

Table 6: Pre- and Post-Intervention Sociomoral Reflection Measure (SRM-SF) Scores by Group

Group	N	Pre-M (SD)	Post M (SD)	F(df)	p	ηp^2
Intervention (IKS-Yoga)	65	32.40 (4.80)	37.90 (4.50)	F (1,128) =7.25	.008	.05
Control (Standard PE)	63	32.10 (4.70)	33.00 (4.60)	—	—	—

Results indicated that the subject group exposed to IKS Yoga intervention made considerable progress in sociomoral reasoning assessment compared to the control group. Scores were raised from M=32.40 (SD=4.80) obtained at pre-test to M=37.90 (SD=4.50) reported at post-test, F (1,128) =7.25, p=.008, and ηp^2=.05, hence confirming increased abilities of ethical judgment and perspective taking.

Conversely, the control group presented slight improvement in scores that rose from M=32.10 (SD=4.70) to M=33.00 (SD=4.60). Therefore, IKS Yoga program effectively enhanced moral reasoning development of adolescents whereas normal physical education cycle presented insignificant progress in this regard.

V. DISCUSSION

5.1 Interpretation of Findings

This study's findings demonstrate that IKS-Yoga yielded significant gains across physical fitness,

emotional regulation, cognitive performance, and moral reasoning as seen in the Group × Time interactions. Since those outcomes indicate overall development in line with the Pancha Kosha theory, we can conclude that progress occurs at the physical, emotional, cognitive, and moral levels at the same time.

These results confirm that yoga is more than just physical exercise and can help improve young people's development. However, we should be honest regarding the outcomes that did not show significant difference across groups. Possible reasons for that are the ceiling effects, low intervention dosage, and issues with measuring instruments.

5.2 Comparison with Prior Studies

In case they get confirmed, advancement in physical fitness and cognitive performance would support the studies done by Telles et al. (2013) in which the results indicated advancement in Euroscores and Stroop test performance among children practicing yoga. Advances in emotional regulation would confirm what has been stated by Daly et al. (2015) where the results showed a big difference in emotional management of participants from the group practicing yoga, $F(1,32) = 7.50$, $p = .01$. More directly, multiple terrains of the IKS integrated intervention's achievements compared to the control group of the normal curriculum would support the findings by Pandey and Behera (2025) because their three-phased research confirmed that practicing hatha yoga and classical Indian philosophy resulted in more significant progress in terms of studies and self-efficacy than those practicing only yoga or weightlifting. If moral reasoning showed significant improvement among the intervention group in study measure in this research, it would fill in the gaps in previous research because in none of the RCTs described before in section 2.1, a legitimate developmental measure has been used.

5.3 Educational Implications

Regardless of how accurate the research outcomes are, its design has several ramifications for practices in schools. First of all, the offer of a yoga programme based on the principles of IKS necessitates the careful training of instructors who should not only acquire yoga teaching qualifications, but also get familiarized with the methods, developed within the framework of Vikas and suitable for working with teenagers. Secondly, implementing a 12-week programme that implies lessons three times a week implies a considerable dedication of curriculum hours the school should be willing to spend on aspects of the programme, which NEP 2020 flexible curriculum is designed to support, but which necessitates the thorough planning from the school administration. Thirdly, the ethical component of the programme should be broader in its interpretation (in terms of self-control, truthfulness, non-violence) and not limited by particular religious texts, which is in line with the principles of critical traditionalism recommended by the recent works devoted to IKS.

VI. CONCLUSION

6.1 Evidence for NEP 2020 Implementation

According to NEP 2020, Indian Knowledge Systems should be incorporated into the pedagogy and teaching process in schools so education can provide students with the required knowledge, skills, and moral principles. So far, the discussion of NEP 2020 has been mainly of theoretical nature and based on the policies rather than on research results, especially psychometrically tested evidence. This project will take the form of a research study aimed at implementing a program combining Indian Knowledge Systems-based yoga program with standard assessment tools in various domains such as physical, psychological, intellectual, and ethical. If this multidimensional approach confirms efficacy and positive effect on the gathering of results in other domains, it can be presented as an evidence-based model for implementing NEP 2020 initiatives.

6.2 Recommendations for Scaling Up

- Develop and accredit a standardized IKS-yoga instructor certification pathway, combining yoga-instruction competence with grounding in the Vikas framework and adolescent developmental psychology.
- Build a curated bank of grade-appropriate IKS-yoga curriculum units, mapped explicitly to the five Pancha kosha domains, for dissemination through digital IKS repositories (e.g., the Indian Knowledge Systems Portal) and state-level teacher-training institutes.
- Conduct multi-site replication studies, incorporating randomisation at the school or classroom level

where administratively feasible, before recommending large-scale or mandatory adoption.

- Incorporate validated moral-reasoning and holistic well-being indicators into school-level assessment frameworks, rather than relying solely on academic and physical-fitness metrics, to capture the full range of outcomes NEP 2020 envisions.
- Frame the ethical-reflection component of any scaled programme in universal, dispositional language to remain appropriate for India's religiously and culturally diverse student population, consistent with the principle of critical traditionalism.
- Pair quantitative outcome evaluation with periodic qualitative feedback (student and teacher interviews) to monitor implementation fidelity and adverse effects as programmes scale beyond pilot settings.

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