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Indian Knowledge Systems and Yoga-Based Pedagogy in 21st Century Education

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Abstract
Modern education has placed more stress on whole-person development and thus the demand of pedagogies in support of whole wellness of learners has become ever more urgent. Based on Indian Knowledge Systems (IKS), embodied cognition theory, the biopsychosocial model of health and the holistic framework on health of the World Health Organization, the current study investigates the potential of yoga-based embodied learning in enhancing learners' physical wellness, mental well-being, perceived stress and overall holistic wellness. The primary purpose of the study was to evaluate: the group differences in well-being between yoga and non-yoga based pedagogical practices, the associations between yoga practice and well-being indicators and the contribution of yoga based pedagogy to well-being. Employing a quantitative descriptive approach to research, data were gathered from 100 students using established self-report measures of wellness. Statistical analysis was performed using descriptive statistics, independent samples t tests, Pearson's correlations and multiple regression analysis. Results Despite students, in particular those with yoga-based pedagogy, exhibited moderate to high levels of physical wellness, mental well-being and overall holistic wellness in addition to low to moderate levels of perceived stress. There were significant differences between the yoga and non-yoga groups for all the dimensions of well-being. Length of yoga practice was a strong positive predictor of holistic wellness and, yoga-based pedagogy explained 58% of the variance in overall wellness, becoming the strongest predictor beyond general physical activity. The study concludes that yoga-inspired embodied learning exemplifies transformative pedagogy that has the potential to cultivate holistic learner wellness in modern educational settings.

Keywords: *Biopsychosocial model, Embodied cognition, Holistic wellness, Mental well-being, Physical wellness, Perceived stress, Yoga practice*

1. Introduction

Increasingly worried about the physical, mental and emotional health of learners in today's education, scholars and educators are paying greater attention to holistic and embodied approaches to pedagogy, including those that draw on Indian Knowledge Systems (IKS). Learning is an all-inclusive activity for which there is no separation among the body (śarīra), mind (manas), intellect (buddhi) and consciousness (citta) within traditional Indian philosophy of education, a perspective that is in agreement with contemporary integrated model of biopsychosocial health (Myers et al., 2000; Radhakrishnan, 1951). As a fundamental part of IKS, yoga is an embodied epistemology, in which knowledge is acquired through disciplined bodily practice, control of breath and vigilant attention and which has a significant affinity with the theoretical perspectives of embodied cognition, which maintains that "cognition is profoundly shaped by aspects of the body"(Varela et al, 1991). Yoga practice has been empirically shown to improve physical health, promote better mental health and decrease perceived stress in several populations (Cramer et al., 2014; Ross & Thomas, 2010). Interventions derived from yoga have also been found to facilitate emotional regulation, attentional control and stress resilience and thus improve the overall well-being of learners (Khalsa &

Butzer, 2016) in schools. Although more and more evidence are on the rise, current literature tends to consider yoga as a supplementary wellness practice and not investigate its pedagogical positioning within institutionalized educational traditions (yoga) as very few quantitative studies have explored the same on its way of knowing on its wellness outcomes as well as its contribution factor compared to general physical activity. Filling this void, this paper presents a comparative qualitative analysis of yoga-based embodied learning as IKS-Epistemically grounded educational practice and explores its effects on multiple dimensions of learner wellness and its potentials for informing holistic, evidence-based student-centered pedagogy in the context of 21st century education.

1.1 Significance of the Study

The importance of the present study lies in the fact that in today's education, the physical health, mental health and stress of students have gradually become the attention of the whole society and this type of teaching intervention is more in line with the demand of students and educational development. Through the lens of Indian Knowledge Systems (IKS) and embodied learning theory, our paper contextualizes yoga-based pedagogy and in a way aligns traditional epistemological knowledge and contemporary educational research. It provides empirical evidence for the view of yoga as not just a co-curricular wellness pursuit, but a transformative pedagogical practice that supports holistic learner growth. These results add to the sparse quantitative research on yoga as a teaching methodology that affects diverse wellness outcomes. In addition, this study provides useful lessons for curriculum developers, teachers and policy makers for withstanding the challenge of the 21st century by offering empirical rationale for the inclusion of yoga based embodied learning in formal educational systems as a means to encourage sustainable learner wellness, resilience and harmonious growth.

2. Objectives of the Study

The present study was conducted with the following objectives:

I. To evaluate physical wellness, mental well-being, perceived stress and general holistic wellness in students.
II. To compare the well-being outcomes of students receiving the yoga-based curriculum with those receiving more traditional curriculum.
III. To Explore the associations between length of yoga practice, participation in embodied learning and holistic well-being.
IV. To examine the predictive value of a yoga-based pedagogy for global holistic wellness over and above that of general physical activity.

3. Hypotheses of the Study

The following null hypotheses were formulated and tested:

$H0_1$: There was no statistically significant difference in physical fitness of students taught under Yogic Methodology and those under Traditional Methodology.

$H0_2$: There is no significant difference in mental well-being of students who have attended yoga based and regular curriculum.

$H0_3$: There is no significant difference in perceived stress between learners exposed to yoga-based pedagogy and those exposed to conventional pedagogy.

$H0_4$: There is no significant relationship between duration of yoga practice and overall holistic wellness.

$H0_5$: Yoga-based teaching does not uniquely contribute to holistic well-being beyond that of general physical activity.

4. Material and Methods

Research Design: This research is a non-experimental descriptive correlational study with quantitative approach in which it proposes to compare groups, the relationships and predictor implications of yoga-based embodied learning on the learners' wellness results.

Population and Sample: The study was conducted among people who were studying at tertiary level institution. 4.5 Participants A purposive sample of 100 learners (N = 100) was drawn to represent both learners who were regularly exposed to the yoga-based pedagogical practices and those who were taught (in the control group) through conventional pedagogical practice.

Variables of the Study

Independent Variables:

- Yoga-based pedagogy
- Duration of yoga practice
- General physical activity

Dependent Variables:

- Physical wellness
- Mental well-being
- Perceived stress
- Overall holistic wellness

Data Collection Tools

Data were collected via a standardized self-report questionnaire, including validated subscales assessing dimensions of wellness. The application of standardized tools allowed for the results to be dependable, valid and comparable. Physical Wellness Scale – assessed learners' perceived physical health, vitality and functional fitness.

- **Mental Well-Being Scale** (adapted from standardized well-being inventories) – assessed emotional stability, psychological well-being and positive affect.
- **Perceived Stress Scale (PSS) –** a popular validated instrument that was created by Cohen et al. (1983) to measure one's subjective evaluation of stress.
- **Holistic Wellness Composite Scale** – reflects an integrated physical, emotional, mental and social wellness framework based on the WHO's holistic health model.

Standardized questionnaires were used as they have known psychometric properties, reduce measurement bias and are adequate to be used in quantitative analysis with large samples. The measures have good internal consistencies (Cronbach's alphas≥.70) in previous research and therefore, are also appropriate for research in educational and health-related fields.

Procedure of Data Collection

Following informed consent, surveys were completed by participants in a university classroom. Participants were guaranteed confidentiality and anonymity and answers were gathered in compliance with ethical research protocols.

Statistical Techniques

The collected data were analyzed using:

- Descriptive statistics (Mean, SD)
- Independent samples *t*-test
- Pearson's product–moment correlation
- Multiple regression analysis

These methods were chosen to meet the study goals for group comparison, evaluation of relationships and prediction of holistic wellness results.

5. Results and Discussion

Results

The present research is a quantitative study investigating the impact of yoga-based pedagogy integrated with Indian Knowledge Systems (IKS) on learners' health and fitness, mental health, perceived stress and general% Holistic Wellness. The standardized self-report instruments that were used to collect data on 100 learners (N = 100). Statistical analysis included descriptive statistics, t-test for independent samples, Pearson's product–moment correlation and multiple regression analysis. The significance level was set at $p < 0.05$.

Descriptive Statistics of Study Variables

Physical health, mental health, perceived stress and overall well-being were computed for all participants to evaluate their baseline levels. The findings are tabulated in **Table 1.**

Table 1 Descriptive Statistics of Wellness Variables (N = 100)

Variable	Mean (M)	Standard Deviation (SD)	Minimum	Maximum
Physical Wellness	72.84	8.15	54	91
Mental Well-Being	74.36	7.62	56	93
Perceived Stress	37.90	6.41	24	56
Overall Holistic Wellness	75.12	7.98	58	94

Source: *Data compiled from primary survey conducted by the researcher (2025).*

Finding: The mean scores show physical wellness, mental well-being and overall holistic wellness at moderate to high levels, along with perceived stress at low to moderate levels. This pattern appears to indicate a at positive wellness orientation in the learners and particularly in those who I exposed to yoga based pedagogical approaches.

Analysis: The moderate to high levels of physical wellness, mental well-being and overall holistic wellness, as well as low to moderate levels of perceived stress, observed are in line with the results of prior empirical research on yoga-based and embodied pedagogies. Regular practice of yoga has been cited as a major factor in the enhancement of one's physical fitness, emotional control and mental health as well as reduction in levels of stress (Cramer et al., 2014; Ross & Thomas, 2010). In the context of education, yoga-informed interventions have been demonstrated to increase self-regulation, mindfulness and stress management in students, thereby contributing to more positive overall wellness profiles (Khalsa & Butzer, 2016). Meta-analyses also confirm that yoga is moderately to strongly effective in reducing perceived stress and enhancing mental well-being in people with a variety of mental disorders (Cramer et al., 2018). Thus, the present results are consistent with prior research and support the claim that participation in yoga-based pedagogical approaches promotes a broadly positive and holistic wellness profile in students.

Comparison Between Yoga-Based Pedagogy Group and Non-Yoga Group

To examine group differences, participants were divided into two groups:

- Yoga-Based Pedagogy Group (n = 50)
- Non-Yoga Pedagogy Group (n = 50)

An independent sample *t*-test was conducted and the results are summarized in **Table 2**.

Table 2 Comparison of Wellness Variables Between Yoga and Non-Yoga Groups

Variable	Group	Mean	SD	t	p
Physical Wellness	Yoga	77.18	7.42	3.94	.000
	Non-Yoga	68.50	8.06		
Mental Well-Being	Yoga	78.64	6.89	4.21	.000
	Non-Yoga	70.08	7.73		
Perceived Stress	Yoga	33.72	5.81	4.56	.000
	Non-Yoga	42.08	6.29		
Overall Wellness	Yoga	80.21	7.01	4.39	.000
	Non-Yoga	69.94	8.17		

Source: *Data compiled from primary survey conducted by the researcher (2025).*

Finding: There were a few variables on which significant differences were found. Learners participating in yogic pedagogy scored higher in physical well-being, mental well-being, perceived stress (lower) and overall holistic well-being than learners in traditional pedagogy.

Analysis: The significant differences between the group of learners who were taught using yoga-based pedagogy and those who were taught with traditional pedagogy are also in agreement with previous studies. Yoga-based educational and wellness programs have been consistently shown to improve physical health, mental health and perceived stress, possibly since yoga practices reflect an integrative mind-body perspective (Ross & Thomas, 2010; Cramer et al., 2014). Yoga in education has been demonstrated to enhance emotional regulation, attention control and stress resilience and these advances are associated with an increased state of overall holistic wellness among students (Khalsa & Butzer, 2016). In addition, meta-analytic findings support that yoga-based interventions lead to significantly greater improvements in psychological well-being and stress reduction relative to non-yoga or standard exercise-based interventions (Cramer et al., 2018). Hence, the present results are in line with the literature and further support yoga-based pedagogy as the better approach in enhancing holistic learner wellness.

Relationship Between Yoga Practice and Wellness Indicators

A Pearson's correlation analysis was run for relationships between yoga experience (length of yoga practice), the embodied learning frequency and the holistic wellness. The findings are displayed in **Table 3.**

Table 3 Correlation Matrix of Yoga Practice and Wellness Variables

Variable	1	2	3
1. Duration of Yoga Practice	1		
2. Embodied Learning Engagement	.63**	1	
3. Overall Holistic Wellness	.71**	.59**	1

Note. p < .01

Source: Data compiled from primary survey conducted by the researcher (2025).

Finding: At the time of practicing yoga was very highly positively correlated with overall well-being (r = .71). Participation in embodied learning experiences was also significantly correlated with wellness results.

Analysis: The positive correlation between the length of practicing yoga and the overall holistic well-being (r = .71) aligns with prior findings, suggesting a left-skewed dose-response pattern relating long-term yoga practice to positive well-being outcomes. Duration as well as regularity of practice has been reported to have an impact on the efficacy of yoga in enhancing physical health, emotional regulation and psychological well-being, with longer and more stable practice leading to better results, as sustained practice enables deeper self-regulation, mindfulness and stress resilience (Cramer et al., 2014; Park et al., 2016). In the same way, the post-intervention significant positive relationship between participation in embodied learning experiences and indicators of wellness is also consistent with embodied cognition theory, which theorizes that learning/experiences situated in bodily perception and movement enhance one's cognitive, affective and psychosocial processing (Varela et al., 1991). Furthermore, studies in the context of education also indicate the potential of embodied methods, including yoga, to promote the development of attention control, emotional regulation and adaptive coping mechanisms, ultimately resulting in greater levels of holistic wellness among students (Khalsa & Butzer, 2016). Collectively, these results highlight sustained yoga practice and embodied learning as primary factors in influencing all facets of learner well-being.

Predictive Role of Yoga-Based Pedagogy in Holistic Wellness

A multiple regression was performed to evaluate the predictive power of the yoga-based pedagogy and general physical activity on the holistic well-being. Results are shown in Table 4.

Table 4 Multiple Regression Analysis Predicting Overall Holistic Wellness

Predictor	β	t	p
General Physical Activity	.32	3.68	.001
Yoga-Based Pedagogy	.51	5.94	.000
R^2	.58		
F	65.27		.000

Source: *Data compiled from primary survey conducted by the researcher (2025).*

Finding: The regression model explained 58% of the variance in holistic wellness (R^2 = 58). Yoga-related pedagogy was the best positive predictor, exceeding general physical activity.

Analysis: The finding that the regression model accounted for 58% of the variance in holistic wellness (R^2 = .58) reflects a robust and meaningful predictive relationship is a fair judgment, which is cited as the upper limit in educational and behavioral research. The fact that yoga-based pedagogy became the strongest predictor, surpassing that of general physical activity, aligns with previous empirical findings which stress the distinctive integrated aspects of yoga. Unlike general physical activity, yoga incorporates physical movement, breath control, meditation and introspective awareness and thus influences more aspects of physical, mental and emotional health (Ross & Thomas, 2010; Khalsa & Butzer, 2016). Other regression and intervention studies have found that yoga-based practices are significant predictors of decreases in stress and enhancements of mental well-being over and above those attributed to traditional exercise alone (Cramer et al., 2014). From the perspective of Indian Knowledge Systems, this finding substantiates the conception of yoga as a holistic epistemic practice that nurtures equanimity between body, mind and consciousness and therefore having a greater influence on total wellness implications than mere physical forms of activity.

5.1 Discussion

This study makes a strong case with quantitative data, establishing yoga-based pedagogy drawing from IKS as a unique approach of education that fosters the holistic wellness of learners in the 21st century [Table 1]. Yoga-Based Pedagogy and Holistic Wellness Elevated levels of physical wellness, mental well-being and holistic wellness together with low levels of stress are consistent with IKS view of learning as a process that considers body (śarīra), mind (manas), intellect (buddhi) and consciousness (citta). Education in Indian philosophical traditions is viewed as a transformative process of attuning or aligning oneself (akin to balance) with the Self and not mere information acquisition (Radhakrishnan, 1951).The results are consistent with the World Health Organization's (2020) conceptualization of health as a complete state of physical, mental and social well-being. Yoga-based pedagogy enacts this definition in education by incorporating embodied awareness, breath regulation and reflective practices into learning processes.

Group Differences and Epistemological Significance

Notable differences between the yoga and non-yoga participants reveal that embodied modes of learning yields better outcomes in terms of well-being. From an epistemological standpoint, this reaffirms the IKS position that

knowing is lived-experience, not merely thinking (Sharma, 2018). Yogic pedagogy promotes that the disciples realize teachings through lived-bodily experience, which confirms the tenets of embodied cognition (Varela et al., 1991).
These are consistent with previous empirical studies showing benefits of yoga on physical health, emotional regulation and stress resilience (Cramer et al., 2014; Ross & Thomas, 2010). However, this research builds upon and broadens the existing literature by locating yoga specifically within the educational epistemology, as opposed to the extra: curricular wellness intervention.

Correlational and Predictive Insights

The robust association between the duration of yoga practice and overall well-being highlights the dose–response relationship that is characteristic of embodied learning. The practice of yoga over a substantial period of time promotes continued ability to focus attention, emotional resilience and self-regulation – all of which are important for learning effectively (Khalsa & Butzer, 2016).This supports the biopsychosocial model (Engel, 1977) with the regression results showing the yoga-based pedagogy as the most significant predictor of wellness, which further suggests that pedagogies that consider physiological, psychological, social aspects of a person collectively have maximum effect.

Relevance to 21st-Century Education and NEP 2020

In the light of NEP 2020, which emphasises experiential, holistic, value-based education, yoga-based pedagogy provides a culturally rooted and scientifically validated model. It brings together ancient Indians ways of knowing with current educational needs and challenges, including academic stress, apathy and the mental well-being issues faced by contemporary students.

On the whole, the study results confirm for us that IKS-informed yoga pedagogy is a powerful epistemic and pedagogical framework that has the potential to transform the process of education into one that is holistic and wellness-based rather than being just a supplementary practice. By merging embodied learning with mainstream education, schools can nurture students that are healthier, stronger and more self-aware.

Educational Implications

The results of this study can significantly contribute to educational theory, practice and policy. The positive impact of yoga-based pedagogy on physical health, mental well-being and conceived holistic wellness implies that schools may need to shift the focus of instruction from the purely cognitive and output-based models to more embodied and holistic learning models. Incorporating yoga-based embodied learning in institutionalized curricula may help learners manage stress, regulate their emotions and enhance self-awareness, contributing to more supportive learning environments. From the perspective of teacher education, the findings point to the importance of designing professional development courses for teachers in yogic and embodied pedagogical approaches. At the policy level, this study lends evidence-based support for the integration of yoga and IKS in national education systems in consonance with the emerging ethos of educational reforms such as well-being, life skills and holistic growth. In conclusion, we propose that yoga-based pedagogy may offer a viable, culturally relevant and research-based means to nurture learner wellness in the context of 21st-century education.

Hypothesis Testing

The null hypotheses stated for this study were tested by using the relevant inferential statistical procedures. Results of independent samples t-tests showed significant differences between the yoga-based pedagogy participants and the traditional pedagogy participants on physical wellness, mental well-being, perceived stress and total holistic wellness. Thus, the H0s pertaining to group difference ($H0_1$, $H0_2$ and $H0_3$) were rejected. A strong positive relation between duration of practice and holistic wellness was found through Pearson's correlation analysis, thus $H0_4$ was rejected. In addition, multiple regression analysis further revealed that yoga-based pedagogy significantly predicted holistic wellness and explained 58% of the variance, which was greater than the predictive power of general physical activity. Hence, the null hypothesis $H0_5$ was rejected as well. These findings attest to the importance of yoga-based embodied learning as a contributor to positive learner wellness outcomes.

Limitations and Future Directions

Findings of the study are meaningful, there are some limitations to this study. First, a self-report questionnaire was used, which could have led to a response bias of social desirability or subjective perception. Second, because the sample size was only 100 learners, the results may not be generalized to other learning contexts. Third, because of the study's cross-sectional design, it is not possible to establish causality with regard to potential long-term effects of yoga-based pedagogy on wellness measures. These limitations could be addressed by future research with longitudinal or experimental methodologies to investigate causal processes and continuing effects over time. Studies with larger and more diverse populations from different educational levels and cultures are also

encouraged. Further, research may also be conducted using qualitative or mixed methods designed to investigate the lived experiences of learners of yoga-based embodied learning and interrogate further its epistemological underpinnings in the context of Indian Knowledge Systems.

Conclusion

This empirical study in the field of quantitative research clearly demonstrates that yoga-based embodied learning is effective as a teaching practice to improve students' holistic well-being. The results suggest that learners who received yoga-based pedagogy had better physical wellness and mental wellness, lower perceived stress and better overall holistic wellness than those who received traditional pedagogical methods. The claim that length of yoga practice was strongly related to every measure of wellness and that yoga-based pedagogy was the strongest predictor of every measure of wellness suggests the broad-based integrative power that yoga holds for potential transformative change in education. Rooted in Indian Knowledge Systems and modern constructs of embodied cognition and whole health the study affirms the significance of yoga as an epistemological and pedagogical instrument. To sum up, teaching yoga pedagogy in schools is not only doable but necessary for growing balanced, tenacious and wholesome students in the 21st century.

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