

A COMPARISON OF COGNITIVE FUNCTIONS OF YOGA BASED (GURUKULA) WITH MODERN EDUCATION SYSTEM

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A B S T R A C T

Background

The Gurukula Education System (GES) is the oldest system of education in Indian heritage and culture. The wisdom and practices of Yoga included in GES are time tested and have been preserved for millennia in an unbroken tradition. In the tradition it is believed that GES bestows great merits on society, and improves many aspects of student life, including improvement in their cognitive functions. Its advantages stand at the heart of the tradition. Examining this idea that the GES curriculum can enhance cognitive abilities, forms the basis of the research carried out in this study by comparing any enhancements with those observed in the Modern Education System (MES). The MES is more aimed at 'bread earning', and left brain development than total personality development, which was the key aim of GES. Values were built into this total personality development to create citizens from different categories of students, with the skills and professionalism needed by society to build ideal social values. Attempts to rebuild such GES to suit the needs of modern society today have started showing very encouraging results. They incorporate the holistic approach of personality development with values on one hand, and skill training for bread earning on the other hand. The question then arises as to whether the GES approach of total personality development also improves the cognitive functions to levels comparable to those in MES. This question is vital to the adoption of GES in modern society. This study attempts to answer the question using standard modern scientific research tools to measure memory, IQ, sustained attention and planning ability developed in students undergoing the two systems – GES and MES.

Literature review

Total personality development in GES includes physical, mental, emotional and intellectual development of students. While the mental personality includes

development of memory and attention span as a vital function, the intellectual personality includes intelligence and its applications such as planning ability. Specific references about these aspects are presented from ancient Indian texts. They show that these texts aim at total personality development, and also contain techniques for cognitive function development. All available information on Gurukula Education System (GES) from the Vedas to Epics were compiled.

In contrast, the MES was gradually evolving, slowly moving towards 'bread earning skill development'. This is presented together with an account of how it is mainly based on left brain development. A literature review is also given of published modern scientific literature on the benefits of Yoga on cognitive variables like memory and attention. This provides a historical backdrop for the present experimental work.

Intelligence is a significant brain function. Memory and attention are vital temporal and frontal lobe functions. Planning skills play a key role in the higher developmental processes related to the frontal lobe. Previous studies have shown that Yoga practice improves these cognitive functions. Kory and Hufnagel (1997) found growth of intelligence and better academic performance among school students practicing Transcendental Meditation. Naveen (1997) found that voluntary regulation of breathing (Präëäyāma) improves the memory. Telles (1993) studied special physical postures (Āsanas), voluntary regulation of breathing (Präëäyāma), maintenance of silence, and visual focusing exercises (Träöaka), improve the attention span in school children. Manjunath showed that planning ability is improved by practice of Yoga. Thus cognitive functions like memory improve through practice of Yoga. But, how does GES, the Yoga-based education compare to modern education, in improving psychological variables memory, attention, planning and intelligence? That is the theme of this study.

Aim and Objectives

Aim

To examine the GES ability to develop cognitive abilities of students to levels comparable with those in MES.

Objectives

1. To compare changes in levels of Intelligence due to student participation in the two systems.
2. To study the influence of GES and MES on spatial and verbal memories of students.

3. To investigate the effect of GES compared to MES on students' attention span.
4. To examine the effect of GES and MES on planning ability scores.

Methods

Subjects

Two residential schools (one MES and the other GES) providing similar ambiance and daily routines were selected for the study. Forty-nine boys with an age range of 11 to 13 years who were matched for age and socio-economic status were selected out of a total strength of 500 in MES and 110 in GES.

Learning strategies

The GES School used an educational program with integrated yoga practices, while the MES provided a conventional modern education program. The GES program included lectures, yogic postures (Āsanas), voluntary regulated breathing (Prāṇāyāma), meditation (Dhyāna), recitation of mantras (japa), yogic prayers, worship (Pūjā), and Yogic games (a set of games which not only gives stimulation, but also relaxation, and generally calms the mind). The equivalent set of practices for the control group in the MES program, included physical exercises, mathematical puzzles, music, prayer and normal sports.

Assessments

C.M. Bhatia's performance tests of intelligence were administered to assess IQ; spatial and verbal memory tests were conducted to assess the memory; the "Six Letter Cancellation" test was used to assess sustained attention, and the "Tower of London" test to assess planning ability before and after one academic year (10 months).

Data Collection and Analysis

Data were obtained for each test, initially and after one academic year (10 months) intervention period. Data were scored and entered into raw data tables. To check standardization of tests, the pre-data were compared with published normative standard data from similar subjects.

The Kolmogorov-Smirnov Test of Normality showed that the pre-data were not normally distributed. Hence non-parametric tests were used in the analysis. Within groups, the pre-post data were analyzed using the Wilcoxon Signed Ranks Test, while between groups pre-data and post-data were analyzed using the Mann-Whitney U Test. This showed the pre data for the two groups were

well matched. Statistical analysis was carried out using SPSS 10.0.

Results

An Independent Sample's 't' Test showed no significant difference in pre-data of all parameters, between the GES and MES groups. The Wilcoxon Signed Ranks Test comparing the pre-post values within the groups showed that improvements in both groups were significant at $p < 0.005$. Between groups Mann Whitney U test indicates that the GES boys showed significantly greater improvements than MES boys: on all IQ test scales; both Spatial and Verbal memory tests; and the Six Letter Cancellation Test. ($p < 0.005$, Mann-Whitney U test).

On the Tower of London Test, differences between the two groups were significant on three of the four subscales, planning, execution and mean time, but only on one of the number of moves subscales (Mann-Whitney U Test). In all cases, smaller numbers of moves were significant. Between groups, the GES group showed greater improvement than the MES group on trial four of the planning time, trials two, three and four of execution time, and in the trial two for mean number of moves ($p < 0.005$, Mann-Whitney U test).

Conclusions

1. Scriptural review revealed that the GES curriculum includes various practices, which calm the mind and develop cognitive skills. It also indicated how the consciousness-based approach to education develops the overall personality more effectively than the matter-based approach.
2. The most prominent result in the experimental studies is that both systems of education improved IQ, memory, sustained attention, and planning ability. However, the GES students improved significantly more on all the tests.
3. The present study with its clear indication of enhanced cognitive abilities opens the way for further, larger, long-term studies.

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