

3.0 REVIEW OF SCIENTIFIC LITERATURE ON SCHOOL-BASED YOGA

3.1 BACKGROUND

The inclusion of *yoga* in the school curricula is dependent on its feasibility and efficacy in delivering pre-decided outcomes. Therefore, the first aspect to understand is the issues faced by children and adolescents that is necessitating interventions and *yoga* is being considered as a possible solution. The second aspect is the development of school-based *yoga* modules, their dosage and means of instruction. The third aspect is providing scientific evidence of the benefits *yoga* and its efficacy in solving identified youth problems. With this background, a systematic plan can be drawn up to review scientific literature regarding school-based *yoga*.

Regarding issues facing children and youth, an assessment of child and adolescent mental health (CAMH) could be the starting point. Such assessment has led educationists to conclude that children and adolescents are in need of social-emotional learning (SEL) to help deal with socio-psychological and emotional issues. What constitutes SEL is, therefore, the next area of review. Scholars have further flagged concerns over deteriorating character of the youth and its possible impact on society at large. Their concerns need to be looked at critically. Cognitive performance is central to education and the impact of *yoga* in enhancing cognitive performance needs to be reviewed. Similarly, its impact on physiological health needs to be reviewed as well. Many scholars have made a case for incorporating *yoga* in education and their work is also reviewed.

One key component of school-based *yoga* is the development and validation of modules. Literature on methodology of development and validation of *yoga* modules has been reviewed. Finally, in the last three decades, literature on outcome-based benefits of *yoga* in schools has grown exponentially. This aspect is a major area of focus in the review.

3.2 AIMS AND OBJECTIVES

Aims:

1. To understand contemporary issues with children and adolescents and gaps in education curricula to address these issues.

2. To understand the case for *yoga* to solve contemporary problems facing the youth.
3. To understand the protocols for developing and validating *yoga* modules for use in developing school-based *yoga* modules.
4. To understand the scientific evidence of benefits arising from the practice of school-based *yoga*.

Objectives:

1. To evaluate literature on CAMH and SEL.
2. To evaluate literature on need for character education.
3. To evaluate literature on the case for *yoga* in education.
4. To evaluate literature on scientific *yoga* module development and validation.
5. To evaluate literature on benefits of the practice of *yoga*.
6. To evaluate literature on classroom *yoga* modules.

3.3 CHILD AND ADOLESCENT MENTAL HEALTH AND NEED FOR SOCIAL-EMOTIONAL LEARNING

CAMH:

Keiling et al (2011) evaluated the prevalence of CAMH issues and interventions to prevent and treat them. They reported that mental health problems affect 10-20% of children and adolescents worldwide, constituting almost a third (2.2 billion) of the world's population. Further evidence showed that a substantial proportion of mental health problems in adults originated early in life. Action was imperative to reduce the burden of mental health problems and to allow for the full development of children and adolescents. Despite the widespread recognition of the importance of mental health promotion and prevention in children and adolescents, there was an enormous gap between needs and resource availability. Major international non-governmental organizations and UN agencies, with the exception of WHO, failed to acknowledge, or only infrequently focused on, child mental health. The researchers identified undernutrition, conflict related trauma and insufficient preventive strategies as the main causative factors for CAMH issues. Parent and teacher training and psycho-social interventions were found to be most prevalent interventions. However, scaling up remained an issue. This required a high degree of political will coupled with inter-sectoral collaboration between education, social care and criminal justice systems.

A longitudinal study followed a cohort with psychiatric diagnosis from ages 11 to 26. It found that 73.9% had received a diagnosis before the age of 18 and 50% before the age of 15. Adult disorders were generally preceded by their juvenile counterparts or by other disorders. Specifically, adult anxiety and schizophreniform disorders were preceded by a broad array of juvenile disorders. For all adult disorders, 25% to 60% of cases had a history of conduct and/or oppositional defiant disorder. The study concluded that most adult disorders should be reframed as extensions of juvenile disorders. In particular, juvenile conduct disorder was a priority prevention target for reducing psychiatric disorder in the adult population (Kim-Cohen et al, 2003).

A WHO survey was conducted across 17 countries around the world. Lifetime prevalence, projected lifetime risk and age of onset of DSM-IV disorders were assessed with the WHO Composite International Diagnostic Interview (CIDI), a fully-structured lay administered diagnostic interview. The study found that the age of onset was very early (7-15) for anxiety and impulse control disorders. Lifetime prevalence estimates were: anxiety disorders 4.8-31%, mood disorders 3.3-21.4%, impulse control disorders 0.3-25%, substance use disorders 1.3-15.0%, and any disorder 12-47.4%. Projected lifetime risk is proportionally between 17% and 69% higher than estimated lifetime prevalence, with the highest ratios in countries exposed to sectarian violence. These results clearly document that mental disorders are a common occurrence. Since many mental disorders begin in childhood or adolescence, interventions aimed at early detection and treatment might help reduce the persistence or severity of primary disorders and prevent the subsequent onset of secondary disorders (Kessler et al, 2008).

A study in the USA also found linkages of adult mental disorders with childhood and adolescent onset. The data reviewed commonly occurring DSM-IV mental disorders. Roughly half the population met the criteria for one or more such disorders in their lifetimes, and roughly one fourth of the population met at least one criterion in any given year. Most people with a history of mental disorders had first onsets in childhood or adolescence. Some anxiety disorders (phobias, separation anxiety disorder) and impulse-control disorders had the earliest age of onset distributions. This finding was in line with the global WHO survey. Other anxiety disorders (panic disorder, generalized anxiety disorder, post-traumatic stress disorder), mood disorders and substance disorders typically had later ages of onset. Given that most seriously impairing and persistent adult mental disorders were associated with child-adolescent onsets and high co-morbidity, increased efforts were needed to study the public health implications of

early detection and treatment of initially mild and currently largely untreated child-adolescent disorders (Kessler and Wang, 2008).

Another study in the USA analyzed Teen Health 2000 data. Disorders examined were anxiety, mood, Attention Deficit Hyperactivity Disorder (ADHD), disruptive and substance abuse/dependence disorders, in the past year. Incidence rates were 2.8% for anxiety, 1.5% for mood, 1.2% for ADHD, 2.5% for disruptive, 2.9% for substance abuse/dependence, and 7.5% for one or more DSM-IV disorders. Multivariate analyses identified few independent predictors of incidence. The most consistent factors across disorders involved indicators of stress. The role of adverse family context was particularly noteworthy, predicting incidence of every disorder examined. Personal resources, such as mastery, consistently enhanced resilience to onset of first episodes (Roberts, Roberts and Chan, 2009).

The situation in India is also alarming. A pilot study, a part of the National Mental Health Survey (2016), reported a 7.3% prevalence of mental disorders among children aged 13-17 years. It was nearly equal in both genders. Nearly 9.8 million young Indians aged between 13-17 years were in need of active interventions. Prevalence of mental disorders was nearly double in urban metros (13.5%) as compared to rural areas (6.9%). The most common problems were Depressive Episode & Recurrent Depressive Disorder (2.6%), Agoraphobia (2.3%), Intellectual Disability (1.7%), Autism Spectrum Disorder (1.6%), Phobic Anxiety Disorder (1.3%) and Psychotic Disorder (1.3%). A recent study among 15-24 year olds in the state of Himachal Pradesh revealed that adolescents suffered from a wide range of mental health conditions like Depression (6.9%), Anxiety (15.5%), Tobacco Abuse (7.6%), Alcohol Abuse (7.2%) and Suicidal Ideation (5.5%), requiring urgent interventions. Early recognition and intervention could help to realize favorable outcomes, concluded the report (Gururaj et al, 2016).

There are other Indian studies that covered larger samples in specific states or cities. Their findings were even more alarming. Malhotra and Patra (2014) did a systematic analysis of 16 community based and 7 school-based studies. The study found a prevalence rate of psychiatric disorder to be 6.46% in community studies and as high as 23.33% in school-based studies. The cumulative sample size of community-based studies was 14,594 and of the school-based studies it was 5687. An epidemiological study was conducted in Madurai (Tamil Nadu, INDIA) to assess the prevalence of psychiatric problems amongst school children using Rutter B Scale. 755 children were screened and 207 children were clinical evaluated. 33.7% of respondents

had psychiatric morbidity. The prevalence rate of specific disorders were: Conduct disorder 11.1%, Enuresis 14.3%, Hyperkinetic Syndrome 1.7% and Mental Retardation 2.9%. Low intelligence, lower socio-economic status and lack of parental involvement in children's studies were significantly related to psychiatric morbidity (Deivasiganamani, 1990). Another epidemiological study to determine the prevalence rates of child and adolescent psychiatric disorders was conducted in Bangalore (Karnataka, INDIA) by the Indian Council of Medical Research. The sample size was 2064 children aged 0-16 years. The ICD-10 DCR criteria were used to reach a penta-axial diagnosis. The results indicated a prevalence rate of 12.5%. There were no significant differences among prevalence rates in urban middle class, slum and rural areas. The psychiatric morbidity among 0-3 year old children was 13.8%, with the most common diagnoses being breath holding spells, pica, behavior disorder, NOS, expressive language disorder and mental retardation. The prevalence rate in the 4-16 year age group was 12.0%. Enuresis, Phobia, Hyperkinetic Disorders, Stuttering and Oppositional Defiant Disorder were the most frequent diagnoses. Physical abuse and parental mental disorder were significantly associated with psychiatric disorders (Srinath et al, 2005).

Social-Emotional Learning (SEL)

The findings regarding the state of CAMH started a movement in the USA which suggested that young people need techniques to develop social-emotional competencies. The Collaborative for Academic, Social and Emotional Learning (CASEL) defines itself as 'a trusted source for knowledge about high-quality, evidence-based social and emotional learning (SEL)'. It supports educators and policy leaders and enhances the experiences and outcomes for all Pre-K-12 students. It defined SEL as:

Social and emotional learning (SEL) enhances students' capacity to integrate skills, attitudes and behaviors to deal effectively and ethically with daily tasks and challenges. CASEL's integrated framework promotes intrapersonal, interpersonal, and cognitive competence. There are five core competencies involved:

- ***Self-awareness:***

This refers to the ability to accurately recognize one's own emotions, self-perception, thoughts and values and how they influence behavior. The ability to accurately assess one's strengths and limitations, with a well-grounded sense of confidence and optimism. Self-efficacy is a trait linked with self-awareness.

- ***Self-management:***

The ability to successfully regulate one's emotions, thoughts, and behaviors in different situations - effectively managing stress, controlling impulses and motivating oneself. The ability to set and work toward personal and academic goals.

- ***Social Awareness:***

The ability to take the perspective of and empathize with others, including those from diverse backgrounds and cultures. The ability to understand social and ethical norms for behavior and to recognize family, school and community resources and supports.

- ***Relationship Skills:***

The ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. The ability to communicate clearly, listen well, cooperate with others, resist inappropriate social pressure, negotiate conflict constructively and seek and offer help when needed.

- ***Responsible Decision Making:***

The ability to make constructive choices about personal behavior and social interactions based on ethical standards, safety concerns and social norms. The realistic evaluation of consequences of various actions, and a consideration of the well-being of oneself and others.

There is evidence suggesting a linkage between SEL and improved mental health, resilience, character, academic performance, reduced drug use and lower anti-social behavior. Further, most educators, parents and students believe that schools need to go beyond academic instruction and develop skills to help children succeed in life. However, the pressure to enhance the academic performance leave schools with little time and resources to develop SEL skills. Nevertheless, schools are being pressured to implement educational approaches that not only focus on academic success, but also promote behavioral health. The education system is in need of programs that support mental and physical health that can be easily integrated into the school curriculum. Historically, Western scholars have argued that personal and social development should be an integral part of education (as quoted in Elias, 1990; James. 1890; Terman, 1914). William Jones (1890) suggested that focus, attention, character, self-control, inner strength, health and well-being determined whether a child was in an optimal state to learn and strongly influenced his or her academic success or failure. Terman (1914) stated that the health and welfare of a child should be accorded as much importance as arithmetic and geography. Elias (1990) argued that that excessive academic demands would be counter-

productive, leading to little increase in learning and an exacerbated stress situation. A growing interest in promoting SEL in US schools culminated in 1994, when the Collaborative for Academic, Social and Emotional Learning (CASEL) emerged following a Fetzer Institute meeting on positive youth development (Butzer, Bury, Telles and Khalsa, 2016; CASEL, 2014).

3.4 CASE FOR CHARACTER EDUCATION

The Thinking of Western Scholars:

Pala (2011) underscored the need for character education in the current environment. She defined character as a distinctive mark that differentiated ourselves from others. People of good character know the good, love the good, and do the good. The character traits should include, but were not limited to courage, good judgment, integrity, civility, kindness, perseverance, responsibility, tolerance, self-discipline, respect for school personnel, responsibility for school safety, service to others and good citizenship. A person's 'character' referred to the disposition and habits that determine the way that a person normally responded to desires, fears, challenges, opportunities, failures and successes. The intentional teaching of good character was particularly important in today's society since our youth faced many opportunities and dangers unknown to earlier generations. They were bombarded with many more negative influences through the media and other external sources prevalent in today's culture. An increasing proportion of young people were growing up without a firm understanding or commitment to the core ethical values needed to inform and energize the conscience. As a result, they lack internal mechanisms to help them know right from wrong and to generate the will power to exercise self-control and consistently do what is right.

Lickona (1996) has been a strong advocate of character education. He listed ten troubling youth trends cutting across national borders and indicative of the scale of the problem: (i) rising youth violence, (ii) increasing dishonesty like lying, cheating and stealing, (iii) greater disrespect for parents, teachers and authority figures, (iv) increasing peer cruelty, (v) a rise in bigotry and hate crime, (vi) the deterioration of language, (vii) a decline in the work ethic, (viii) increasing self-centeredness, accompanied by declining personal and civic responsibility, (ix) a surge of self-destructive behaviors such as premature sexual activity, substance abuse and suicide and (x) growing ethical illiteracy. To correct this trend, Lickona (1999) wrote about the relationship between virtues and character and the nature of character education. Good character consists

of virtues. More the virtues, stronger the character. He defined virtues as objectively good human qualities such as wisdom, honesty, kindness and self-discipline. They were needed to lead a fulfilling and harmonious life, both individually and for the community. Building on virtues, he said that the core principle of education was to cultivate virtues. Character educators seek to help students to perform kind, courteous and self-disciplined acts repeatedly - until it became relatively easy for them to do so and relatively unnatural for them to do the opposite. The ancient Greeks named four 'cardinal virtues': prudence (which enabled us to judge what we ought to do), justice (which enabled us to give other persons their due), fortitude (which enabled us to do what is right in the face of difficulties) and temperance (which enabled us to control our desires and avoid abuse of even legitimate pleasures). He suggested a comprehensive approach to character education entailing: (i) the teacher acting as caregiver and role model, (ii) creating a moral school community, (iii) practice moral discipline, (iv) creating a democratic classroom, (v) including the teaching of character in the curricula, (vi) using collaborative learning, (vii) fostering values of hard work and public service, (viii) encouraging moral reflection, (ix) teaching conflict resolution, (x) inculcating a sense of altruistic service and (xi) encouraging parent participation in character education. The resemblance of these suggestions with ancient Indian education is uncanny. Ancient Indian education laid the greatest importance on character and personality development. Its methods included a strong teacher-student bond, emphasis on ethics and morality in everyday life, weightage to character education in the curricula, reflection as a tool for learning and full support of the community and parents to the ideals of education. On a broader level, Lickona (1996) linked character with the task of building a moral society. He enumerated three compelling reasons for including character education in the school curricula. First was that good character was essential for mental strength, good judgement, empathy, self-discipline and moral courage, all hallmarks of being fully human. The second reason for character education was that it made schools better places. The environment for learning was made more conducive and the school community made more caring. The third was the linkage between a critical mass of citizens with good individual character and a moral society.

Pigozzi (2006) added a UNESCO perspective on quality of education from a sociological perspective. The emerging educational needs and relevance to society was necessitating a re-think on the concept of education. The linkage of education with national economic performance, the pushback from parents, education keeping pace with the fast-changing global work environment, unevenness in quality across education systems, ability of education to deal

with discrimination, racism and violence were driving the need to reassess. Education was being asked to become one of the tools that could build societies based on peace, equality and democratic practice. While in the past much of the emphasis was on cognitive development, there was now a need to also address the social and other dimensions of learning. Education was expected to make a contribution to sustainable human development, peace and security, universal values, informed decision-making, and the quality of life at individual, family, societal and global levels. There was a suggestion to place inner learning at the center to achieve the new goals of education. A high-quality education had to consider the learner as an active participant and a central part of educational efforts.

Commenting on the method of correcting student behavior, Kern and Manz (2004) noted the increase in disruptive and insubordinate student behavior. They found that the punitive model to manage student behavior did not produce the desired effect. In some cases, harsh discipline exacerbated the problem. Instead, positive approaches like establishing rules, praising appropriate behavior and ignoring minor transgressions resulted in decreased school violence and vandalism and improved the school climate. This finding was in conformity with ancient Indian education practices that encouraged self-discipline and eschewed punitive methods.

The *Gurukula* System Mirrors the Thinking of Western Scholars:

O'Sullivan (1997) studied the *Gurukula* system of education from the perspective of the tradition in which it had evolved. In this tradition, education was described in terms of its purposive nature, the goal being to develop consciousness. Consciousness, in turn, was described as a state of reality which enabled the soul to identify as spiritual and, in that capacity, discriminate between spirit and matter. Individuality, in this analysis, was defined as the constitutional position of the soul. The *Gurukula* endeavored to provide a framework within which its members could develop the capacity to cultivate a level of consciousness suitable for participation in the culture represented by this spiritual world-view. The curricula was designed to enhance both the cultural and the cognitive process. The learning included both the power to discriminate within a religious framework and maintaining the independence to think critically. Hence, in the *Gurukula* system, we find a living example of the ideals the Western character educationists are suggesting.

Rather (2015) evaluated the *Gurukula* system to suggest what can be implanted into modern education that helps develop the whole person. He found that the teaching of moral values, culture, character building and ability to solve social problems could be borrowed from the *Gurukula* system and imparted in the modern educational environment. His findings were that modern educational environment was characterized by indiscipline and materialistic thinking. Imparting good character values in this environment was a challenge. The modern proponents of character education have also commented on the decline of character. *Gurukula* education was founded on the principle that man is divine and education aimed at self-fulfillment. It developed moral values, whole personality and strong character. Gaining mastery over the senses through simple living was stressed. The student-teacher relationship was very special and added to education in no small measure. A homely atmosphere, pedagogy of read and question, imparting of education in a democratic manner, strengthening of national solidarity and a religious outlook were the hallmarks of *Gurukula* education. Rather suggested that some important ideas could be borrowed from the *Gurukula* system and implanted in modern education environment. This may contribute to both SEL and character education. He suggested that a separate moral education section, aimed at solving current behavioral problems, be added to the curricula; discipline be brought back with the ideal of simple living and high thinking; transforming the teacher-student relationship drawing inspiration from the *Gurukula* system and giving character building equal weightage as acquisition of knowledge. The graduate should thus be imbued with a gentle personality, good social behavior, respect for elders, for women and for teachers. This may equip them to work towards eradication of social evils. It can be seen that the ways of imparting character education suggested by modern scholars uncannily mirrors the methods employed by the *Gurukula* system.

3.5 CASE FOR INTEGRATING YOGA WITH EDUCATION

Butzer, Burry, Telles and Khalsa (2016) proposed a theoretical model based on modern research that addressed concerns around stressors faced by young people. Their model suggested that practicing *yoga* was an effective way to promote social-emotional learning. SEL involved acquisition and practice of knowledge, skills and attitudes that enhanced personal development, interpersonal skills, ethics and productivity. The five key competencies sought to be developed included self-regulation of emotions, self-awareness of emotions and their

impact on others, social awareness, which is the ability to appreciate perspectives of others, relationship skills and responsible decision making. They stated that existing research demonstrated the positive effects of school-based *yoga* but raises questions regarding the mechanisms underlying these effects. There was a need to understand why *yoga* was beneficial. They hypothesized that *yoga* facilitated the development of three key competencies: mind-body awareness, self-regulation and physical fitness. Mind-body awareness enhanced mindfulness, attention, concentration, Self and social awareness. Self-regulation included emotional and stress regulation, resilience, equanimity and psychological self-efficacy. Physical fitness encompassed flexibility, strength, balance, respiratory function and physical self-efficacy. These, in turn, had a positive downstream effect on behavior, mental state, health and performance. They concluded that school-based *yoga* was a useful complement to existing SEL programs. Their model is shown in Figure 7.

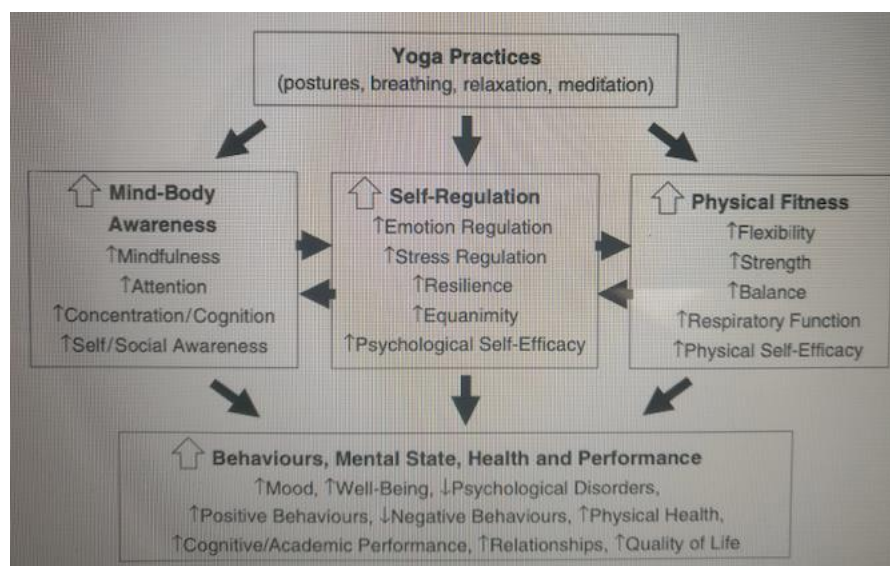


Figure 7 - Hypothesized Association Between *Yoga* and Well-Being (Butzer, Bury, Telles & Khalsa, 2016)

Waters, Barsky, Ridd and Allan (2015) reviewed fifteen studies on school meditation programs to create a school-based meditation model. They borrowed the definition of contemplative education (CE) from Roeser and Peck. “A set of practices that may foster particular forms of awareness in students, forms conducive to the conscious motivation and regulation of learning, and also to freedom and transcendence in life more generally.” The steps in meditation are: (i) directing focus to an ‘attentional anchor’, (ii) dispassionately observing internal and external

distractions and disengaging from them and (iii) focusing back from distractions to the attentional anchor. The analysis of the fifteen studies showed that meditation impacted student well-being, social competence and academic performance. Longer duration programs and more frequent practice were found to be more effective. Interestingly, interventions delivered by teachers were more effective. Their model hypothesized that meditation created brain changes impacting cognitive functioning positively and (2) improved emotional regulation. These, in turn, had a positive effect on well-being, social competence and academic performance. They stated that teaching methods that developed these two functions had long-term benefits for students, even beyond school life. Their model of school-based meditation is shown in

Figure 8.

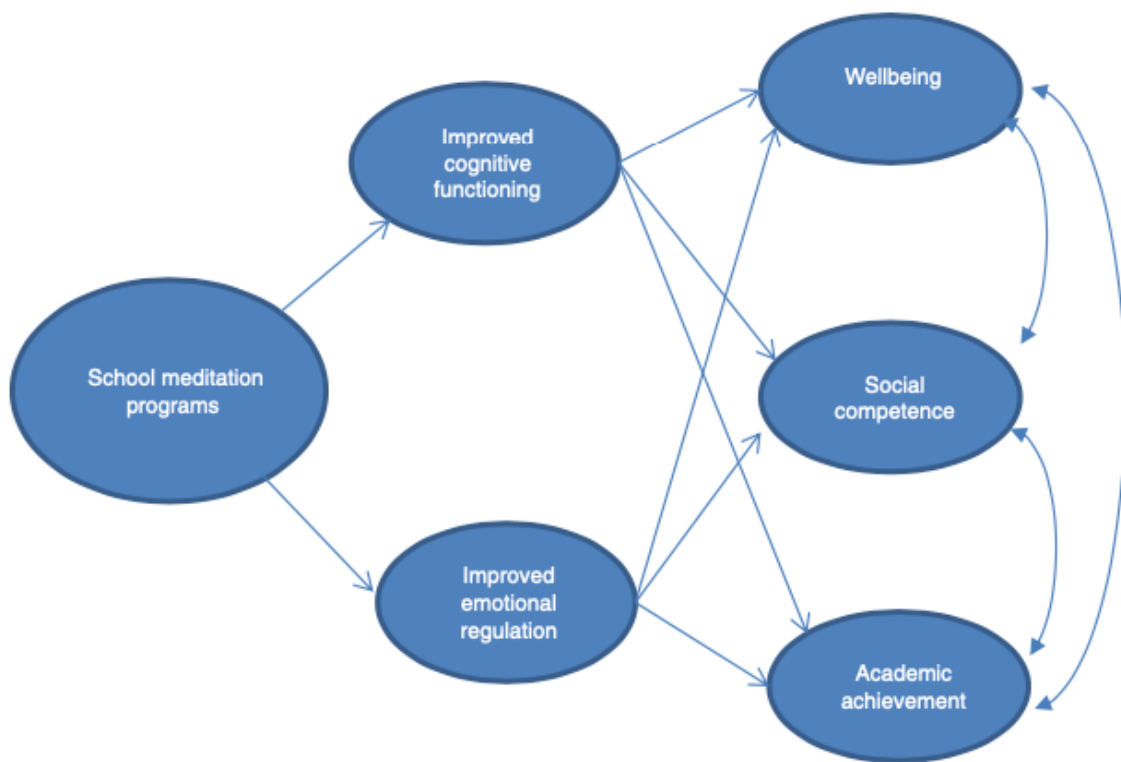


Figure 8 - The School-Based Meditation Model
(Waters, Barsky, Ridd & Allan, 2015)

Hyde (2012) argued for the inclusion of *yoga* in the school curriculum on the basis that *yoga* could contribute positively to the development of the whole child. The Association for Supervision and Curriculum Development’s Commission (ACSD) defined the whole child as intellectually active, physically, verbally, socially and academically competent; empathetic, kind, caring and fair; creative and curious; disciplined, self-directed and goal oriented; free,

critical thinker, confident and cared for and valued. *Yoga* was seen as a gentle, non-competitive self-practice that increased balance of mind and body. She argued that, in the USA, the tendency to invent a practice was arguably more popular than adopting anything from India or the Far East. However, there was a strong evidence-based case for treating *yoga* as a therapeutic intervention without adopting any philosophical or spiritual aspect. Her main arguments in favor of including *yoga* in the school curriculum were: (i) Most Western educators consider the role of education as being a way to material success and means of personal happiness. The knowledge of the Self was missing, which *yoga* could provide. (ii) Learning about *yoga* could be a means of exploring another culture and could be seen as an inclusive multicultural education. (iii) Even the pockets of controversy over including *yoga* provided opportunities for critical and democratic conversations in a pluralistic society. (iv) According to SEL standards, students should be able to evaluate how advocacy for the rights of others contributed to the common good. The outcomes of *yoga* were awareness and understanding of the feelings of others (emotional fitness), tolerance and respect (mental fitness) and understanding of one's impact and contributions (social fitness). These factors aid the evaluation and respect for the rights of others. (v) *Yoga* practice was transformative. Teacher self-care and student self-transformation was a distinct possibility with *yoga*. *Yoga* practice provided access to all domains of the work on Self, recognized in transformative education namely, knowing the Self, controlling the Self, caring for the Self and recreating the Self. (vi) The advantages and benefits of *yoga* could be framed in the larger context of societal transformation. Self-change led to transformed interpersonal relationships. This, in turn, had the potential to create a critical mass of like-minded people which ultimately impacted society at large.

Hagen and Nayer (2014) argued that there were four key factors that contributed to mental health challenges amongst children and adolescents. These were: (i) Globalization, that had exposed the youth to multiple new demands, standards, and options. (ii) The pressure to succeed, driven by increased competition, was impacting mental health negatively. (iii) There were unwelcome distractions and attractions linked to new media technologies. At one level, technologies were valuable learning and communication resources. At another level, excessive time spent on media was taking away from physical and group activities and creating a host of mental problems like dependency, obsessive-compulsive behavior, concentration and attention disorders. (iv) Linked to over exposure to media, there were safety concerns like cyberbullying,

exposure to violence, sexually explicit material and other inappropriate behaviors. In this scenario, the ability of *yoga* to calm the mind and increase overall well-being was driving its popularity the world over. Recent scientific research on *yoga* provided empirical evidence that it may contribute to physiological and mental health. Attention, self-esteem, empowerment and self-regulation were enhanced. By enabling children to listen inward to their bodies, feelings, and ideas, *yoga* helped in developing self-awareness. This, in turn, helped children and adolescents develop their own unique personalities and achieve the balance between intrinsic strengths and societal expectations.

To summarize, the case for school-based *yoga* was built on empirical evidence of its effect on cognitive efficiency, emotional regulation and physical fitness. These had a positive impact on physical health, psycho-social well-being and behavior. There was a suggestion that *yoga* may be self-transformative and a tool for inward listening. It was, thus, hypothesized that *yoga* could address contemporary youth problems. On a broader canvas, *yoga* may be a tool capable of moving education beyond a means for material success to develop the whole child.

3.6 YOGA MODULE DEVELOPMENT AND VALIDATION STUDIES

In this section, 8 studies concerning development and validation of tailor-made *yoga* therapy modules are discussed. Four studies stopped at subject matter expert validation and four studies went further and conducted a pilot research to ascertain feasibility and efficacy. Four studies developed modules for treatment of physiological ailments and four studies developed modules for treatment of psychological ailments.

Validation Only Studies:

Isha, Deshpande, Ganpat and Nagendra (2015) developed and validated an integrated *yoga* module (IYM) for treatment of heart diseases. The method used was to tailor make the module to include *yoga* practices deemed efficacious for heart ailments, as mentioned in classical texts of *yoga*. A questionnaire was sent to 40 subject matter experts. It listed the practices and the subject matter expert was expected to rate each practice as not essential; useful but not essential; and essential. Content validity ratio (CVR) developed by Lawshe was used as the statistical analysis tool. The result showed that 32 out of the 39 practices indicated significant content validity.

Another study aimed to develop and validate an IYM for treating Parkinson's disease. The practices were chosen based on mentions in ancient texts of *yoga*. 20 subject matter experts rated the 28 practices included. Using Lawshe's CVR, 21 practices were selected (Kakde, Metri, Varambally, Nagarathna and Nagendra, 2017).

A *yoga* intervention was developed as a therapy for schizophrenia. The module was designed based on mentions in traditional and contemporary literature of *yoga*. 10 subject matter experts rated the 15 practices. Lawshe's CVR analysis was used and 13 practices were retained. (Govindaraj, Varambally, Sharma and Gangadhar, 2016).

This study aimed to develop a validated *yoga* module for children with intellectual disabilities. The module included *yoga* practices that were mentioned in classical texts and further backed by evidence in modern research. A total of 32 practices were included and each practice was rated by 22 subject matter experts. 31 practices were validated using Lawshe's CVR (Pise, Pradhan and Gahrota, 2017).

Validation Plus Pilot Studies:

Chronic Lower Back Pain (CLBP) is a significant health problem. A *yoga* therapy module was developed to treat CLBP. The practices were selected based on mentions in traditional and contemporary literature of *yoga*. 30 subject matter experts rated the 26 selected practices. Lawshe's CVR was the statistical tool used and 20 practices were validated. The revised module was pilot tested with 12 patients. They showed a significant reduction in pain measured by Oswestry Disability Scale and Perceived Stress Scale (Patil et al, 2015).

Hariprasad et al (2013) developed a *yoga* based intervention for the elderly. The module was designed based on mentions in traditional and contemporary *yoga* literature. 10 subject matter experts rated each practice on a 5-point Likert scale. 10 elders then participated in a pilot study. All of them were able to perform the practice but had difficulty in remembering and completing the sequence independently.

Bhat, Varambally, Karmani, Govindaraj and Gangadhar (2016) developed a *yoga* therapy module for treating obsessive compulsive disorder (OCD) and got it validated by 10 subject matter experts. The experts rated each practice on a 5-point Likert scale. 22 of the 35 practices were selected based on the statistical analysis of expert ratings. The final version of the module

was pilot tested with 17 OCD patients and found to be both feasible and efficacious. The practice resulted in improvement in OCD symptoms measured on the Yale-Brown Obsessive-Compulsive Scale.

A study aimed to develop a *yoga* therapy module targeting specific clinical features of depression. *Yoga* practices were matched for clinical features of depression based on a thorough literature review. A structured questionnaire, using a 5-point Likert scale, was developed for validation by 9 experienced *yoga* professionals. All practices were validated by the experts. A pilot study was conducted with 7 patients. 5 patients who completed the module reported more than 80% satisfaction about the *yoga* practices. Severity of depression substantially reduced at both 1 and 3 months follow-up (Naveen et al, 2013).

3.7 EFFECT OF SCHOOL-BASED YOGA ON PHYSIOLOGICAL HEALTH AND FITNESS

Galantino, Galbavy and Quinn (2008) completed a systematic review of 24 studies on the effect of *yoga* on physical outcome measures in the pediatric population. The evidence suggested that *yoga* was effective in improving neuromuscular performance, cardiorespiratory fitness and musculoskeletal health. It had a positive impact on motor performance measured by reaction time, planning, execution time, motor speed and sensory motor performance. *Yoga* appeared to have a positive effect on cardiopulmonary functions. It decreased breath rate, decreased resting heart rate, reduced cortisol levels which has an indirect effect on cardiorespiratory health, increased forced respiratory volume, distance walked in a fixed time, improved peak respiratory flow and helped in the treatment of asthma. Studies showed a positive impact on musculoskeletal health. Handgrip strength and endurance improved as did inspiratory and expiratory muscle strength. Significant improvements were found in body composition, fitness, flexibility and body strength.

Later studies have reinforced their findings. A randomized controlled Indian study found that integrated *yoga* practice improved physical fitness, as measured by the EUROFIT testing battery. Improved limb movement, speed, balance, trunk strength and BMI were reported (Telles, Singh, Bhardwaj, Kumar and Balakrishna, 2013). Another randomized control Indian study by Purohit, Pradhan and Nagendra (2016) also measured physical fitness with the EUROFIT testing battery. It showed improvement in balance, reaction time, flexibility,

strength and agility. A randomized controlled Indian study with adolescents found that cardiovascular endurance and lung capacity improved with integrated *yoga* practice (Shivkumar, Suthakar and Urs, 2016). Kumar (2011) found that the practice of *Surya Namaskār* normalized blood pressure, peak expiratory flow rate, forced vital capacity, heart rate and respiratory rates in school children. A randomized control American study by Khalsa, Hickey-Schultz, Cohen, Steiner and Cope (2012) used the Profile of Mood States Short Form (POMS-SF) and a reduction in fatigue and an increase in vigor. Another randomized control study in the USA used the Profile of Mood States (POMS) scale and reported the same findings.

In summary, the practice of *yoga* has been demonstrated to positively impact physiological health and fitness in the pediatric population. The impact was on physical fitness, neuromuscular performance, cardiorespiratory health, musculoskeletal health, reduction in fatigue and increase in vigor.

3.8 EFFECT OF SCHOOL-BASED YOGA ON COGNITIVE PERFORMANCE

Servacki and Cook-Cottone (2012) conducted a systematic review of literature on school-based *yoga* intervention. The review explored the impact of *yoga* on cognitive performance, academic proves and psycho-social measures. Twelve studies were identified. The formats included pilot studies, single cohort, quasi-experimental and randomized clinical trials. The review categorized children on the basis of atypical development, typical developmental in high-risk environments and typical development in normal environments. The atypical development category was represented by children diagnosed with autism and other learning, emotional and behavioral disorders. In this category, researchers found an improvement in IQ, social adaptation, self-confidence, social-confidence, communication, contributions in class, attention and concentration. This compendium of research suggests that *yoga* intervention may prove beneficial for a wide range of behavioral, learning and social problems commonly found in atypically developing children. In the typically developing in high-risk environments category, one study reported decrease in body dissatisfaction and dysfunctional eating behaviors. Perceived self-concept showed an increase. Another study provided evidence of increase in emotional balance and decrease in anxiety. A study reported lower levels of problematic involuntary engagement (rumination, intrusive thoughts, emotional arousal, impulsive action, and physiologic arousal). Collectively, these studies provided preliminary evidence for the protective effects of *yoga* practices for children residing in high-risk

environments. In the typically developing children in normal environments category, improvements were seen in time-on-task and concentration; planning & execution time and depth perception. Overall, the literature reviewed suggested that *yoga* programs could enhance children's body satisfaction, emotional balance, attentional control and cognitive efficiency. It could help in decreasing anxiety, negative thought patterns, emotional & physical arousal, reactivity and negative behavior. As such, participation in *yoga* programs may serve as a protective factor for the typically developing youth.

This study undertook a systematic review of school-based mindfulness interventions on psychological outcomes. Out of the 24 identified studies, 19 studies used a controlled design. In 8 studies, mindfulness training was implemented at elementary school level (grades 1-5), in 2 studies, at middle school level (grades 6-8) and in 14 studies at high school level (grades 9-12). In the domain of cognitive performance, the measures used were attention tests, creativity tests, academic grades and mind wandering paradigm. In the domain of emotional problems, the measures included anxiety, depression, test anxiety, somatic reactions, ruminative thinking style and emotional regulation difficulties. In the domain of resilience and stress, the measures used were well-being, positive and constructive emotions or affect, resiliency, social skills and positive relationships, self-concept and self-esteem. The results indicated that the effects were strongest in the domain of cognitive performance with large and significant effect sizes. Effect sizes were smaller but significant in the domains of resilience and stress measures, and they were small and not significant for measures of emotional problems. Thus, taken from a bird's eye view, mindfulness-based training in a school context had effects that were seen mostly in the cognitive domain, but also in psychological measures of stress, coping, and resilience (Zenner, Herrnleben-Kurz and Walach, 2014).

Many Indian studies with children and adolescents found a correlation between *yoga* practice and cognitive performance. A study by Chaya, Nagendra, Selvam, Kurpad and Srinivasan (2012) explored the cognitive performance in 7-9 years old school children from a socioeconomic disadvantaged background. Cognitive functions such as attention and concentration, visio-spatial abilities, verbal ability and abstract thinking were assessed using an Indian adaptation of the Wechsler Intelligence Scale for Children. *Yoga* was found to be as effective as physical activity in enhancing cognitive performance. Another study assessed the impact of *yoga* on verbal and spatial memory of children aged 11-16. The results suggested

that *yoga* practice improved delayed recall of spatial information (Telles, 2004). A study by Sethi, Nagendra and Ganpat (2013) assessed attention and self-esteem in low-income high school girls. The data analysis showed a significant increase in SE scores, whereas d2 test for attention revealed significant increase in total number of symbols processed scores and decrease in total number of errors. A study by Verma, Shete and Singh (2014) studied the effect of *yoga* practice on cognitive development variables amongst adolescent rural residential school children. They used the Indian adaptation of Guilford's Structure of Intellect Model for the assessment. The study reported significant improvements in measures of mental ability and memory. Two Indian studies reported improvement in executive function as a result of *yoga* intervention. Purohit and Pradhan (2017) studied the effect of *yoga* on executive function amongst a cohort of orphan students. The assessment tools used were Stroop Color-Word Task, Digit Symbol Substitution Test (DSST), Digit Span Test and Trial Making Test (TMT). Significant difference was reported in the *yoga* group for Stroop Color-Word Task and Digit Span Test and part-A of TMT whereas there was no significant difference found in DSST and TMT (part-B). A study by Telles, Singh, Bhardwaj, Kumar and Balkrishna (2013) found that *yoga* intervention improved executive function, as measured by the Stroop Color-Word task.

A study conducted in the USA demonstrated the linkage between *yoga* with cognitive performance. One study evaluated the impact of Mindful Awareness Practices (MAPS) on executive function, as assessed by teachers and parents, using a formal questionnaire. The results indicated that children in the MAPs group, who were less well-regulated, showed greater improvement in EF compared with controls. They showed gains in behavioral regulation, meta-cognition and overall global executive control (Flook et al, 2010). A longitudinal study in Taiwan by So and Orme-Johnson (2001) tested the hypothesis that regular practice of the Transcendental Meditation (TM) technique, for 6 to 12 months, would improve cognitive ability. The measures used were Test for Creative Thinking-Drawing Production (TCT-DP), Constructive Thinking Inventory (CTI), Group Embedded Figures Test (GEFT), State and Trait Anxiety (STAI), Inspection Time (IT) and Culture Fair Intelligence Test (CFIT). The study used univariate analysis and found that Transcendental meditation (TM) positively impacted fluid and practical intelligence, speed of information processing and creative thinking.

To summarize, *yoga* seems to have a positive impact on a vast spectrum of cognitive performance measures. Aspects of intelligence have been reported to improve, ranging from IQ to fluid and practical intelligence and improvement in academic grades. Attentional control, power of concentration, visio-spatial and verbal memory were found to improve. It may be relevant to point out that many educationists have rated development of concentration higher than retention of facts in the goals of education. *Yoga* seems to assist in furthering this aim of education. Speed of information processing, executive function, time-to-task, planning and execution are important cognitive performance measures impacted by *yoga*. Meta-cognition, creative thinking, abstract thinking and constructive thinking have been shown to improve with *yoga*.

3.9 EFFECT OF SCHOOL-BASED YOGA ON EMOTIONAL WELL-BEING

A randomised control study in a secondary school in the USA measured mood, anxiety, perceived stress and resilience. It found that the Yoga group improved significantly on measures of anger control and slightly on anxiety, perceived stress and resilience. The study concluded that *yoga* had the potential of playing a protective or preventive role in maintaining mental health (Khalsa, Hickey-Schulz, Cohen, Steiner and Cope, 2012). Another American study reported significant decreases in anger, depression, confusion, tension and fatigue. The scale used was the Brunel University Mood Scale (BRUMS). The study also reported decrease in negative effects (afraid, sad, gloomy, upset, lonely, ashamed, guilty, nervous), as measured by the Positive and Negative Affects Scale for Children (PANAS-C). In the study, the Control group practice PE. The results suggested that school-based *yoga* may provide unique benefits for students above and beyond participation in PE (Felver, Butzer, Olason, Smith and Khalsa, 2014). In an Indian study, Gusain and Dauneria (2016) studied the impact of *prānāyama* on anxiety levels. They found *prānāyama* had a significant effect on reducing anxiety level. Noggle, Steiner, Minami and Khalsa (2012) evaluated the efficacy of *yoga* for psycho-social well-being in an American school setting. In this controlled study, the Control group practiced PE. The authors administered a string of well-being scales namely, Profile of Mood-States-Short-Form (POMS-SF), PANAS-C, Perceived Stress Scale and Inventory of Positive Psychological Attitudes. The measures of self-regulatory skills included Resilience Scale, State Trait Anger Expression Inventory and Child Acceptance Mindfulness Measure. Measures of

mood disturbance, mood states, tension and anxiety improved in the Yoga group and worsened in the Control group. Negative affect significantly worsened in the Control group and improved in the Yoga group.

An American study aimed to investigate the efficacy of mindfulness training (MBSR) with school girls in reducing perceived stress, enhancing coping abilities, self-esteem, and self-regulation. The study used the School Aged Coping Strategies Inventory Scale. Self-esteem and self-regulation increased in both the Yoga and Control groups. The intervention group was more likely to report greater appraisal of stress and greater frequency of coping (White, 2012). Another quasi-experimental controlled study evaluated the effectiveness of a mindfulness-based *yoga* intervention in promoting self-regulation among preschool children (3-5 year olds) in the USA. This year-long study used multiple scales to measure effortful control (EC), executive function (EF) and attention. Results indicated significant effects across all three indices of self-regulation. It also found that children who were most at risk of self-regulation dysfunction were the most benefited (Razza, Bergen-Cico and Raymond, 2015). Bergen-Cico, Razza and Timmins (2015) conducted a controlled study with emerging adolescents (6th graders). In this study, they assessed the impact of mindfulness *yoga* on self-regulation using the Adolescent Self-Regulatory Inventory. They found that students who engaged in mindful *yoga* demonstrated significant increases in both global and long-term self-regulation. A controlled Indian study assessed the effect of *yoga*-based intervention on psychomotor performance and self-efficacy in school children. Participants were assessed for attention and performance at the beginning and end of 10 days using trail making task, TMT A & B and self-efficacy questionnaire for children developed by Muris (Social, Academic and Emotional Self-efficacy). The *yoga* group showed higher self-efficacy (Das, Deepeshwar, Subramanya and Manjunath, 2016). A study by Bhardwaj, Mookherjee and Bhardwaj (2015) studied the effect of *yoga* on self-adjustment of school going adolescents. This uncontrolled study found a significant improvement in self-adjustment. In an American randomised crossover study, the intervention used was relaxation response. The tests administered were Piers-Harris Children's Self Control Scale, Novicki-Strickland Locus of Control Scale and Daxicon-Medac 3000 Physiological Monitor. The study found that exposure to Relaxation Response resulted in significant increase in self-esteem and a tendency towards greater internal locus of control (Benson et al, 1994). Bharadwaj and Agarwal (2013) assessed the effect of *yoga* on the level

of self-esteem in pre-adolescents school children in a randomised controlled study. The scale used was the Indian adaptation of Battle's self-esteem inventory for children. The *yoga* group showed a significant increase in the level of overall, general and social self-esteem. An American study examined the effect of *yoga* on student stress, affect, and resilience. Perceived Stress Scale, Positive and Negative Affect Schedule and Resilience Scale were administered before and after the *yoga* program. The quantitative analysis indicated that the *yoga* program significantly improved students stress, Positive Affect (joyful, cheerful, happy, lively, proud, energetic, excited, interested, calm) and resilience. The qualitative study indicated that students, teachers and *yoga* instructors, all found the program to be beneficial for students' well-being (Sarkissian, Trent, Huchting and Khalsa, 2018). Servacki and Cook-Cottone (2012) conducted a systematic review of literature on school-based *yoga* intervention. The review explored the academic, cognitive and psychosocial benefits of *yoga*. In the psycho-social domain, the selected studies detected improvements in self-confidence, social confidence, communication and contributions in class. One study reported decreased body dissatisfaction, dysfunctional eating behaviors and increased perceived self-concept. Another study provided evidence of increases in emotional balance and decreases in anxiety. A study reported lower levels of problematic involuntary engagement (rumination, intrusive thoughts, emotional arousal, impulsive action and physiologic arousal).

In summary, the literature suggests that *yoga* programs serve as a protective and preventive factor in maintaining mental health and psycho-social well-being. It enhanced positive attributes linked to emotional health and self-control. Specifically, the studies reviewed reported decrease in anger, anxiety, mood disturbance, tension, perceived stress, body dissatisfaction and problematic involuntary engagement (rumination, intrusive thoughts, emotional arousal, impulsive action and physiologic arousal). Negative Affects (afraid, sad, gloomy, upset, lonely, ashamed, guilty, nervous) were reportedly reduced. The positive attributes enhanced were self-confidence, self-esteem, self-regulation, tendency towards internal locus of control, self-efficacy, self-adjustment, resilience and emotional balance. Positive Affects (joyful, cheerful, happy, lively, proud, energetic, excited, interested, calm) increased.

3.10 EFFECT OF SCHOOL-BASED YOGA ON PERSONALITY CHARACTERISTIC

The Concept of *Guna* Personality Characteristic:

The Indian concept of *guna* is based on the idea that the mind is always in a dynamic equilibrium between three types of response patterns called *guna*. The three patterns are *sattvā* (gentle and controlled), *rajas* (violent and uncontrolled) and *tamas* (dull and uncontrolled). In an ideal situation of perfect health, an individual has the complete freedom to use any of these three patterns of responses. Ill health or limited health occurs if *rajas* or *tamas* become dominant, since one loses freedom and gets habituated to either of these response patterns. Furthermore, in the *Bhāgavad Gitā*, *guna* indicates a specific behavioral style. *Sattvā* indicates gentleness, purity, wisdom, bliss, serenity, love of knowledge, spiritual excellence and other such noble qualities. *Rajas* indicates egoism, activity, restlessness and hankering after wealth, power, valor and comforts. *Tamas* implies qualities such as bias, heedlessness and inertia, besides perversion in taste, thought and action. *Rajas* and *tamas* are said to be the manifestations of a violent state of mind in which a person lacks mastery over upsurges of emotions and impulsive behavior. *Yoga* is known to be useful in promoting positive health at the physical, mental, social, emotional and spiritual domains, which results in becoming energetic, confident, masterful over the sense organs, possessing harmony and coordination between right-brain and left-brain functions, as well as becoming stress-free. These are attributed to the calmness of the mind leading to forbearance and stability of the nervous system, which are the qualities of a *Sattvā*-dominant person (Deshpande, Nagendra and Nagarathna, 2009).

Suchitra and Nagendra (2013) developed and validated the 54-item Sushruta Child Personality Inventory (SCPI) scale to measure *guna* in children. The scale was developed on the basis on ancient *Ayurvedā* literature. It was validated by subject matter experts and a pilot study was conducted to check its feasibility and validity. It was shown to have high internal consistency, reliability and factor validity measured by Cronbach Alpha, split half reliability and validity coefficient scores.

Study Measuring *Guna* Based Personality:

A controlled study measured the effect of *yoga* on *guna* using the SCPI scale. Two hundred children, aged 8-12 years, were divided equally into Yoga and Control groups. The *yoga* group attended a ten-day Yoga Personality Development Camp while the Control group went about their normal routine. The study found that in the Yoga group, *sattvā* increased significantly while *rajas* and *tamas* decreased significantly, as compared to the Control group. The study concluded that Yoga Personality Development Camp had a significant effect on *sattvā*, *rajas* and *tamas* in children (Patil and Nagendra, 2014).

Sattvā personality is characterized by gentleness, purity, wisdom, bliss, serenity, agreeableness, kindness, self-control, firmness and enthusiasm. *Rajas* personality is recognizable by egoism, activity and restlessness while the *tamas* personality is indicated by dullness, indiscrimination, inaction and quarrelsome behavior. Evidence based on modern psycho-social scales directionally point to the development of *sattvā* characteristics and reduction of *rajas* and *tamas* characteristics as an effect of the practice of *yoga*. The increase in Positive Affects (joyful, cheerful, happy, lively, proud, energetic, excited, interested, calm) mirror closely the *sattvā* characteristics. The decrease in Negative Affects (afraid, sad, gloomy, upset, lonely, ashamed, guilty, nervous) directionally indicate reduction in *tamas* (Felder, Butzer, Olason, Smith and Khalsa, 2014; Sarkissian, Trent, Huchting and Khalsa, 2018). The decrease in anger, anxiety, perceived stress, mood disturbance and problematic involuntary engagement would mirror reduction of *rajas* (Servacki and Cook-Cottone, 2012; Khalsa, Hickey-Schulz, Cohen, Steiner and Cope, 2012; Noggle, Steiner, Minami and Khalsa, 2012).

3.11 REVIEW OF CLASSROOM YOGA MODULES

Since the aim of the present study is to develop, validate and test the efficacy of a school-based classroom *yoga* module, the literature on existing school-based classroom *yoga* modules have been reviewed. The studies conducted on classroom *yoga* suffered from methodological infirmities like lack of randomization, small sample sizes, limited details of the intervention and non-standard module design. A study was conducted for a 30-minute once-a-week classroom *yoga* module instructed by a certified *yoga* instructor. The module consisted of a

themed discussion, breathing exercises, physical postures and relaxation techniques. One grade 2 and one grade 3 class participated in the study. There was no Control group. The study found some evidence of stress reduction (Butzer et al, 2015). Another study by Chen & Pauwels (2014) studied the impact of daily practice of a 5-15-minute *Yoga* Ed module comprising *yoga*-based activities. It was an uncontrolled pilot study and required the students, teachers and parents to complete a self-report questionnaire developed by the researchers. The responses were collected at the end of the intervention only and therefore there was no comparison with pre-intervention data. The study found some evidence of positive perceptions of change in mental, emotional and physical well-being. Another study used a 10-minute *yoga* based reflex integration module which is a modified form of *yoga*. It was a quasi-experimental study involving 33 children. The study found minimal effects of the intervention on motor performance, academic performance and behavior (Mische Lawson, Cox & Blackwell, 2012).

The current research on short duration classroom *yoga* is clearly inadequate. There is a need for a methodologically sound study with a validated short duration classroom *yoga* module.

3.12 LINKAGE WITH PRESENT STUDY

Scholars and educationists are rightfully concerned that the undue weightage given to cognitive performance has led to a disregard for social-emotional learning and character education. This has led to serious Child and Adolescent Mental Health (CAMH) issues and deteriorating character. Educationists have suggested inclusion of social-emotional learning as a means to improve intrapersonal and interpersonal skills. They have also suggested inclusion of character education by making teachers role models, creating moral school communities, including character education in the curricula, instilling a sense of service and active parental involvement. These suggestions, uncannily, mirror the ancient Indian education system. The present study builds on these findings and juxtaposes it with ancient knowledge to build a case for integrating *yoga* with education. The thesis claims that including *yoga* will serve the needs of character education, social-emotional learning and education of the whole child.

It was observed that the current theoretical models of school-based *yoga* relied, solely, on scientific research and ignored ancient knowledge. This led to erroneous separation of components of *yoga*, such as, treating meditation and physical postures separately. In the

present study, the theoretical model developed is based on a juxtaposition of ancient and modern knowledge. This gives depth and conviction to the model.

The review of *yoga* module development and validation was used as a guide for the development and validation of the module proposed in this study. Further, the scientific data on the benefits of *yoga* was used extensively to support claims made by ancient texts of *yoga* and to cross check the findings of the pilot and RCT studies that formed part of this thesis.

The mind map linking scientific research and *yoga* in education is shown in Figure 9.

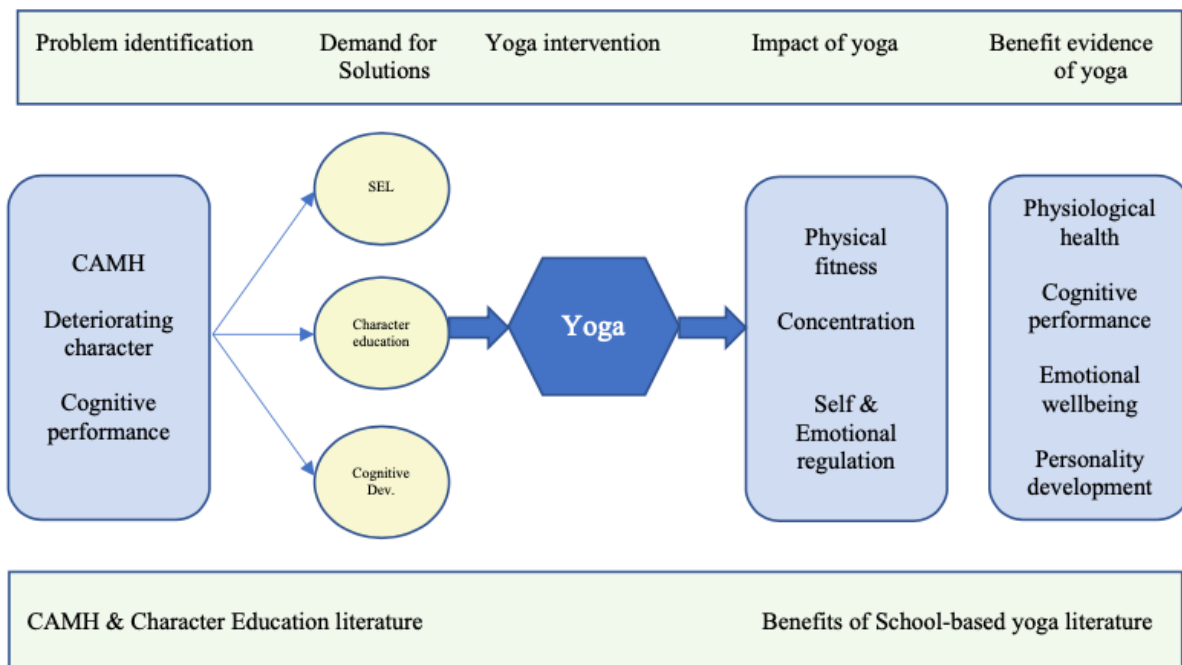


Figure 9 - Mind Map: Linkage Between Scientific Literature and *Yoga* in Education

We have found that yoga is a form of complete education that can be used with all children because it develops physical stamina, emotional stability and intellectual and creative talents. It is a unified system for developing the balanced, total personality of the child.

Swami Satyananda Saraswati