CHAPTER TWO

REVIEW OF RELATED LITERATURE

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After the selection and approval of the research problem, it is natural for an investigator to feel the urge for immediate action. But it is a mistake to rush headlong into planning and carrying out the study without making a thorough survey of the related research literature. It is imperative for the researcher to review related literature to be able to relate his topic to the existing knowledge in the corresponding area, to bring clarity and focus to the research problem and to improve the methodology to be adopted for research. With this perspective, this chapter attempts to review some of the available studies mainly related to the conceptual and practical aspects of systems approach; along with the concept and assessment of spiritual and emotional intelligence.

The main objective of the present study was application of systems approach to science teaching by using systems approach based resource material and learning-teaching strategies. Although, the term systems approach is in vogue, but, in order to apply it to the learning-teaching process, it required a comprehensive understanding of its concept, both from theoretical as well as practical point of view. Most of the time, systems approach is understood as a systematic way of performing some task in terms of inputs, process and outputs, however, this term when understood comprehensively, refers to much more than its general interpretation. Initially, the researcher found the task of applying systems approach to science learning-teaching very challenging. It was through intensive review of research literature related to various aspects of systems such as
systems theory, systems philosophy, systems thinking, systems dynamics, etc. that the researcher got the right direction to proceed in the present research work.

Some of the many relevant studies on theoretical and practical concepts of systems have been reported briefly, in this chapter followed by review of studies on spiritual and emotional intelligence (the dependent variables of the evaluative phase of the present study). In the following description of research literature, studies under each category have been arranged chronologically, as delineated below:

2.1 Review of research literature related to systems approach

2.2 Review of research literature related to spiritual intelligence

2.3 Review of research literature related emotional intelligence

2.4 Conclusion

2.1 Review of Research Literature related to Systems Approach

As the problem of the present study was to develop systems approach based resource material for science teaching, therefore, the researcher explored the studies related to systems approach to understand the way it can be applied to the present issue. In section 2.1.1 some of the studies related to systems approach and its allied aspects have been briefly reported. This is followed by section 2.1.2, in which a critical overview of the reviewed studies is presented keeping in mind the objective of the study.

2.1.1 Studies Related to Systems Approach

This section highlights some of the research literature related to the fundamental and applied aspects of systems approach.

**Objective:** To study the effectiveness of systems approach based various models on character education.

**Methodology:** The researchers have developed various systems approach based models and tested their effectiveness experimentally.

**Findings:** The results of using systems approach based model are: development of district and school cultures, which support effective administrative leadership, constancy of purpose, a safe and caring educational community, integrated curriculum, high expectations, effective adult role models, trust, respect, and high levels of students’ achievement. These results are highly encouraging for the use of systems approach based models in education.


**Objective:** The water crisis has been a “hot topic” in recent years. By synthesizing some of the existing literature on this subject, this thesis aims to encourage Americans, particularly those people less familiar with the topic, to start thinking about water issues in a new way, specifically by thinking in systems.

**Methodology:** Drawing from Donella Meadows, Thomas Hughes, etc. and concepts such as complex adaptive systems, the study frames the problems with bottled water, and the drinking water distribution system, more generally, in a particular way. More specifically, this paper analyzes the water distribution system by breaking it into two
main parts, the municipal water supply and the bottled water industry, and also analyzes these components as a whole system.

**Findings:** The focus of this study has been to provide a well-rounded view of the problems with today’s drinking water system through the lens of systems and systems approach, and with specific attention to the problems associated with the bottled water industry. The model or behavior of systems, used in a variety of disciplines, paints a particular picture of America’s drinking water system that illustrates how bottled water and tap water are inextricably linked and how the problems that affect one part of the drinking water system influence other components. Systems thinking, in turn, explains why problem solving ought to be holistic, rather than only address one component of a system.


**Objective:** This study uses an ecological systems framework to examine how indicators of individual, family, and school contexts are associated with post-secondary educational enrollment among a sample of rural youth.

**Methodology:** This study uses an ecological systems framework and structural equation modeling to examine both direct and indirect effects of indicators of individual, family, and school contexts on school enrollment.

**Findings:** Findings of the current study are that: 1) contrary to existing studies of urban youth, indicators of family income and relationship with parents have only a small significant association with post-secondary school enrollment; 2) indicators of the school
context have strong direct associations with student grades, aspirations, and self efficacy; and 3) the school context is a strong mediator in predicting post-secondary school enrollment. Implications for the existing research literature are discussed.


Objective: The objective of this paper is to analyze the education sector in Kenya, examining the roles and relationships of its sub-sectors by application of systems approach, in order to determine their functions or dysfunctions.

Methodology: This paper uses descriptive method to discuss the impact of absence of a functional system of education on media program development in Kenya. This discussion leads to a conclusion as to whether there exists a functional education system that can satisfactorily support development of educational media programs in Kenya. The implications of the conclusion made on media program development in Kenya are discussed and a way forward for improvement of media program development suggested.

Findings: In the absence of a system of education, media program development becomes very difficult and an unachievable aim. Lack of a system of education allows for educational practices to go on without clear policy to guide and control all activities. It also allows for duplication of functions which causes a lot of confusion lack of direction and lack of standards which make meaningful media program development impossible. Systems thought allows for differentiation and specialization of roles with unification, coordination control for purposes of effectiveness and efficiency of that system. Kenya has
established specialized units but there is lack of proper unification and coordination of their activities. Media program development cannot thrive in such setting.


Objective: This study's goal was to analyze various teaching approaches within the context of natural science lessons, especially in biology. The main focus of the paper lies on the effectiveness of different teaching methods in promoting systems thinking in the field of Education for sustainable development.

Methodology: The following methods were incorporated into the study: special lessons designed to promote systems thinking, a computer-simulated scenario on the topic “ecosystem forest,” and a combination of both special lessons and the computer simulation. These groups were then compared to a control group. A questionnaire was used to assess systems thinking skills of 424 sixth-grade students of secondary schools in Germany. The assessment differentiated between a conceptual understanding (measured as achievement score) and a reflexive justification (measured as justification score) of systems thinking. The following control variables were used: logical thinking, grades in school, memory span, and motivational goal orientation.

Findings: Based on the pretest-posttest control group design, only those students who received both special instruction and worked with the computer simulation showed a significant increase in their achievement scores. The justification score increased in the computer simulation condition as well as in the combination of computer simulation and lesson condition. The possibilities and limits of promoting various forms of systems thinking by using realistic computer simulations are discussed.

**Objective:** To suggest measures for using system dynamic based learning environments for enhancing system thinking.

**Methodology:** System dynamics was used as a suitable method in education for problem-oriented learning and for improving overall system thinking skills. It was proposed that integrated learning environments consisting of system dynamics models and additional didactical material have positive learning effects. This was exemplified by the illustration and validation of a learning sequence concerning market processes.

**Findings:** The authors were of the view that although, quantitative studies indicate the method’s suitability for enhancing system thinking skills, which is generally, accepted as an important educational goal, system dynamics is still hardly used by teachers. A number of reasons have been indicated for this. A major obstacle might be teachers’ lack of system dynamics skills. This could be altered by adding systems dynamics to teacher-training curricula and by devising teacher-oriented system dynamics training. In addition, many more system dynamics based learning environments – not just models – need to be created and published. It would neither be time-efficient nor realistic to expect teachers to construct such environments themselves. Furthermore, if more models could be used online with just a web browser instead of requiring modeling software another barrier to system dynamics’ use in education would be diminished. Finally, it is suggested that the effectiveness of system dynamics in education ought to be examined quantitatively in more detail, especially in comparison to different educational methods.

**Objective:** To analyse systems thinking interventions in educational setting and to test its effectiveness. The goal of this paper was to answer the question: how can we best assess the effectiveness of systems thinking interventions in education? This question begs three sub questions: (1) what is systems thinking, (2) what systems thinking interventions are being used in education, and (3) how have the effect of interventions been measured? The purpose of answering these questions was to propose methods for assessing systems thinking interventions.

**Methodology:** This paper is based on descriptive method of research.

**Findings:** Although systems based interventions have been implemented in K-12 classrooms since the mid 1980s, there is still no clear definition of systems thinking or identification of the best method to test the effectiveness of interventions or methods for teaching systems thinking. The analysis of systems thinking interventions in the classroom yielded an initial set of guidelines for measuring and raising a person’s level of systems thinking.


**Objective:** The objectives of the study were:

i. To compare the conventional way of teaching with systems approach based science teaching.

ii. To suggest measures for incorporating systems approach in science teaching.
Methodology: Mainly theoretical approach has been adopted for fulfilling the objectives of the study.

Findings: The investigator has highlighted the advantages of systems approach in teaching with the help of illustrations to compare conventional teaching style and teaching through systems approach. Llewellyn is of the opinion that regardless of the system being studied, thinking in terms of systems involves thinking about relationships, connectiveness, and context, not content. A systems-thinking approach involves refocusing our understandings from objects to relationships, from contents to patterns, from structures to processes, from individuals to communities, and from microcosms to macrosms. The author feels that middle level science is the rightful introduction for a systems approach, including the study of its parts, sub-systems, inter-connections, and interrelationships. At this level, most students have the cognitive capacity to think rationally in terms of cause and effect and interdependency. Middle level science performance tasks can include analyzing and designing systems, as well as by dismantling and reassembling mechanical systems.


Objective: To suggest systems approach based measures for enrollment management by analyzing enrollment patterns through a systems thinking framework.

Methodology: Using theoretical approach the author has employed systems approach to analyze the enrollment system and to suggest measures for its effective management.

Findings: The holistic approach to enrollment management represented in the Enrollment Management Systems Archetype offers a construct through which enrollment managers and institutional leaders can strategically focus on enrollment dynamics.
However, it is simply a tool for gaining the proper perspectives on internal strengths and weaknesses as well as external opportunities and threats that determine enrollment outcomes. Systems methodology is useless without the institutional will to act and the discipline to manage the course.


**Objective:** To analyze and evaluate the dynamic systems approach as a meta-theory for developmental psychology.

**Methodology:** The dynamic systems perspective has been touted as an integrative metatheoretical framework for the study of stability and change in development. However, two dynamic systems camps exist with respect to the role of higher-order form. This paper evaluates these two camps in terms of the overarching world views they embody.

**Findings:** Some dynamic systems proponents ground their conceptualization of development in pure contextualist terms by privileging the here-and-now in the explanation of development, whereas other proponents adopt an integration of organismic and contextualist world views by considering both local context and higher-order form in their explanatory accounts. These different ontological premises affect how each camp views the process of self-organization, the principle of circular causality and the very nature of explanation in developmental science.
Shunin YU. et al. (2006). *Systems Approach to Language Teaching*

**Objective:** To propose some certain definitions to pedagogical phenomena in the process of language acquisition on the basis of the General Systems Theory.

**Methodology:** The authors considered a group of learners as a *learning system* which being reversely charged with a situational *managerial system* (i.e. mentoring/teaching staff), formed a constituent structural unit of a bigger pedagogical system but keeping at the same time, all its main characteristics. Since, the learning system experiences a purposeful external pedagogical influence, it was considered as a *managed system*. The process of imparting educational information by a mentor was distinguished by its qualitative and quantitative indices. It was regarded as a process of *intellectualization* of a study group in connection with the notion of ‘homeokinetic plato’, which actually reflected different intellectual levels of tested study group, e.g., in a language acquisition. An empirical study was used to analyze the optimum amount of the language material to be included into the final test on Business English.

**Findings:** A model of Intelligent System Management has been worked out. The principles developed were adequate also for other study activities and study courses. The empirical results gave grounds to compile effectively the examination paper material amount and to define the time for its fulfillment. *Optimization Model* of teaching information amount and time distribution was also developed. The system approach to language acquisition allowed implementing all the elements of the educational process most effectively, enabling to manage human resources, time resources and to attain the maximum efficient results in the process of students’ intellectualization.

**Objective:** To analyze and describe distance learning using systems perspective and to propose measures for incorporating systems approach in it.

**Methodology:** This article employs descriptive method to describe distance learning from a systems perspective.

**Findings:** The authors offer checklists of suggested modifications to policies and faculty strategies, along with a list of “keys to success,” including such items as “a positive attitude about overcoming obstacles and challenges” and “universal and user-friendly technology support.” Although these are undoubtedly good suggestions, there is little or no attempt at incorporating these ideas into a systems theory of distance learning.


**Objective:** The overall objectives of this paper were to put the theory and practice of conflict resolution into proper perspective and to introduce the Graph Model for Conflict Resolution as a flexible decision technology for systematically studying real world conflicts which can arise in engineering, international politics, business, and many other fields.

**Methodology:** Specific challenges that had to be overcome in the development of the graph model are described and it is explained how ideas from computational engineering and elsewhere were used to conquer them.

**Findings:** The author firmly believes that the demand for having a range of useful conflict resolution methodologies for addressing a spectrum of worldwide conflict
situations is going to continue to increase in the future. Research is well underway for ascertaining how a describable equilibrium or other state can be reached from a status quo state using a variety of algorithms collectively referred to as states quo analysis. Moreover, the roles that both positive and negative emotions can play in a graph model study need to be formally incorporated into the graph model methodology in a range of meaningful ways.

Kali, Y. et al. (2003). *Effect of Knowledge Integration Activities on Students’ Perception of the Earth’s Crust as a Cyclic System.*

**Objective:** To study the effect of knowledge integration activities on students’ perception of the earth’s crust as a cyclic system.

**Methodology:** In the current research, students’ understanding of the rock cycle system after a learning program was characterized, and the effect of a concluding knowledge integration activity on their systems thinking was studied. Answers to an open-ended test were interpreted using a systems thinking continuum, ranging from a completely static view of the system to an understanding of the system’s cyclic nature.

**Finding:** A meaningful improvement in students’ views of the rock cycle toward the higher side of the systems thinking continuum was found after the knowledge integration activity. Students became more aware of the dynamic and cyclic nature of the rock cycle, and their ability to construct sequences of processes representing material transformation in relatively large chunks significantly improved. Success of the knowledge integration activity stresses the importance of post knowledge acquisition activities, which engage students in a dual process of differentiation of their knowledge and reintegration in a
systems context. The authors suggest including systems based activities in curricula involving systems-based contents, particularly in earth science, in which systems thinking can bring about environmental literacy.


**Objective:** To develop an integrated approach based on the use of general systems theory (GST) and the concept of 'mapping' scientific knowledge (its relationships, connections and generalities).

**Methodology:** With the purpose of providing students with tools for a more holistic understanding of science, an integrated approach based on the use of general systems theory (GST) and the concept of 'mapping' scientific knowledge (its relationships, connections and generalities) is developed. GST is used as the core methodology for understanding science and its complexity. By analogy with geographic maps, the investigators introduce scales of educational 'science maps' - scales of integration.

**Findings:** Three principal scales of integration can be distinguished in GST, which the investigators consider necessary for GST to be effectively applied in education. They are (a) the scale of branches and fields of science, (b) the scale of hypotheses and theories, and (c) the scale of structures and hierarchies. Examples of each of these three scales are provided from the field of physical science. The role of the scientific community in producing accessible, and essential, maps of scientific knowledge for science education is discussed.

**Objective:** To analyze system theory from the standpoint of several perennial philosophic questions: (1) the one versus the many (atomism versus holism); (2) the whole-parts relation; (3) constancy versus change; and (4) vital force. Of particular interest for the study was the question of the ontological status of a system, that is: does a system exist, or do only the parts of the system exist?

**Methodology:** From a philosophic standpoint, the study seeks to determine if systems such as universities, calculus, and pork-belly markets have an independent existence, and what exactly the nature of that existence is.

**Findings:** The author defends a position in between the platonic and the constructivist viewpoints: he disavows the notion of preexisting categories or forms from which particular systems (e.g., universities and labor unions) get their individual existence; however, he also dismisses the constructivist notion that these systems exist only in the minds of the human perceiver. His position is built upon the notion that there are different types of systems including, at least, mathematical, spatial, kinematic, physical, etc. His point is that any particular system may have aspects of more than one system type, which is why complex systems defy atomization. For example, a cell will certainly have biotic system aspects, but will also have physical (chemical, molecular) and spatial aspects.
Satsangi, A. (2002). *Construction of lesson plans using systems approach for teaching economics to class IX and testing their effectiveness.*

**Objective:** To increase understanding level in social science of class IX students and to compare the effectiveness of teaching through systems approach and conventional method.

**Methodology:** Pre-post test with control group experimental design was used for this study. The sample consisted of 70 students, with 35-35 students in the control and the experimental groups.

**Findings:** The experimental group taught through systems approach based lesson plans scored significantly higher than the control group taught through conventional method. On the basis of informal observations it could be said that the students of experimental group who were taught through systems approach showed higher level of interest, argumentation power, contemplation, creativity compared to students of control group taught by conventional method.


**Objective:** To propose a measure for a synthesis of system dynamics and soft system methodology.

**Methodology:** This paper makes a theoretical case for using two systems approaches together. The theoretical and methodological assumptions of system dynamics (SD) and soft system methodology (SSM) are briefly described and a partial critique is presented.
Findings: SSM generates and represents diverse perspectives on a problem situation and addresses the socio-political elements of an intervention. However, it is weak in ensuring 'dynamic coherence': consistency between the intuitive behaviour resulting from proposed changes and behaviour deduced from ideas on causal structure. Conversely, SD examines causal structures and dynamic behaviours. However, whilst emphasising the need for a clear issue focus, it has little theory for generating and representing diverse issues. Also, there is no theory for facilitating sensitivity to socio-political elements. A synthesis of the two called 'Holon Dynamics' is proposed. After an SSM intervention, a second stage continues the socio-political analysis and also operates within a new perspective which values dynamic coherence of the mental construct - the holon - which is capable of expressing the proposed changes. A model of this holon is constructed using SD and the changes are thus rendered 'systemically desirable' in the additional sense that dynamic consistency has been confirmed. The paper closes with reflections on the proposal and the need for theoretical consistency when mixing tools is emphasized.


Objective: To analyze case studies in systems thinking.

Methodology: This paper presents examples of using the SIGGS educational system modeling approach in two diverse educational settings: an elementary school classroom and a museum school. The authors discuss the complexity of the model and make an argument for its usefulness.
Findings: Using their modeling approach, the authors demonstrate the differences between educational contexts and also propose that the results of these educational situations could have been predicted from the models. The authors then use the models to make a case for a radical change in educational theory which is similar to constructivist arguments.

Saba, F. (1999). Toward a Systems Theory of Distance Education.

Objective: To compare between a systems view and physical science view of educational technology.

Methodology: This article discusses the difference between a systems view and what the author refers to as the “physical science” view of educational technology. After briefly discussing some of the history of this approach, the author then enlists some methodological concerns. Chief among these is the limiting nature of the reductionist approach, which he claims is inherent in the physical science view.

Findings: The author charges that the physical science approach to educational research lacks “ecological validity” because the tasks that subjects are asked to perform are decontextualized. “The organism,” he states, “is treated like a machine whose task is to associate inputs and outputs” (p. 27). Another problem with reductionism, the author points out, is that “the imperative of time in all aspects of human existence, including learning, is rarely brought into the picture” (p. 28).


Objective: To understand systemic change in education and propose innovations based on systems approach.
Methodology: This introduction to systems theory in education discusses the author's plan to develop educational theory in a simulation environment. Drawing from the work of Maccia & Maccia, who propose "hypotheses concerning relationships among properties of educational systems," he proposes to build software simulations of the complex interrelations within an educational system, and to use these simulations to help educators and administrators to propose innovations within their systems. An important aspect of why this approach has not been developed, thus, far is that most people do not think in systems manner.

Findings: The author contends that a "paradigm shift" in thinking must occur before an approach such as that of systems will gain general acceptance.


Objective: To discuss the concept and application of systems dynamics within the context of learning.

Methodology: This article is an excellent introduction to the concept of systems dynamics within the context of learning. In the introduction, Sterman declares that “the challenge facing all is, how to move from generalizations about accelerated learning and systems thinking to tools and processes that help us understand complexity, design better operating policies, and guide organization- and society-wide learning.” The author goes on to describe single feedback loops and multiple feedback loops; the latter allows for changes in the learner’s mental models as well as simply allowing the learner to achieve current goals.
**Findings:** The author explains that “the development of systems thinking is a double-loop learning process in which a reductionist, partial, narrow, short-term view of the world is replaced with a holistic, broad, long-term, dynamic view and then redesign our policies and institutions accordingly.” Certain barriers to learning are described, including dynamic complexity, limited information, confounding variables and ambiguity, misperceptions of feedback, flawed cognitive maps and causal relations, and erroneous inferences about system dynamics. The use of simulations as a necessary aspect of learning is also discussed. The author believes that simulation is the only practical way to test various models.


**Objective:** To apply systems approach to teaching ‘energy’ and find out its effectiveness.

**Methodology:** Explorative research was conducted to seek answers to the following questions:

- Can students apply the systems approach correctly in spite of the many and complex preconceptions most of them hold?
- What problems do students experience with the systems approach?
- Does the systems approach lead to any new misconceptions?

**Methodology:** In order to answer the above mentioned questions, the investigators collected the following data: transcribed audio recordings of groups of students answering questions from worksheets, interviews with students, homework assignments and tests.
Findings: Systems approach has its advantages. It visualizes the energy processes and makes students think about these processes. However, there are some serious limitations and teachers should be well aware of them. It will be obvious that the systems approach is applicable to other fields as well, where particle streams or information streams (computer science) are at stake. The systems approach method was found worth trying out.


Objective: To increase the level of understanding of the pupils of higher secondary classes of std. XII science stream in the different topics of physics which are to be taught by using network diagrams and to evaluate its effectiveness.

Methodology: The study used pre-post test with control group experimental design. The sample of the study consisted of 101 pupils studying in std. XII of science stream of Jeevan Bharti School, Surat.

Findings: The teaching of physics through the networks was found better than the traditional method in terms of the achievement of the pupils. However, the high achievers of the control group and low achievers of the experimental group were not found significantly different in terms of their post-test scores.


Objectives: To increase the level of achievement of the students of standard IX in the different chapters of chemistry through network analysis and to study the effectiveness of network analysis in teaching.
Methodology: The present study was an experimental study in which pre-test, post test, control group experimental design was used. The sample of the study consisted of 52 students studying in std. IX of Jeevan Bharti School, Surat. The students were matched on the basis of their achieved scores in science, intelligence, age and sex. Each group had 12 boys and 14 girls. Group A was considered as the control group and group B was considered as the experimental group. The networks were developed for six chapters by the investigator.

Findings: The teaching of chemistry through the networks was found better than the traditional method in terms of the achievement of the students. The achievement of students can be increased by planning the teaching with the help of networks.


Objectives: To develop a linear programme on cell division unit of Biology and to compare the effectiveness of programmed instruction with the traditional method of teaching.

Methodology: This study was an experimental study in which pre-test, post test with control group research design was used. In all 90 students (science stream) of a school of Surat city were selected by purposive sampling. Two matched groups each consisting of 45 students were formed on the basis of their I.Q., age and achievement scores of SSC. Standardized tools were used for data collection. The investigator prepared learning material on cell division along with an opinionnaire and a criterion test.

Findings: The findings of the present study revealed that the developed programmed learning material successfully worked as a self-instructional material. It has proved that
active responding, thinking, self-pacing and real communication could be achieved by using the programmed learning material in the classroom.


**Objective:** To prepare programmed learning material on the topic Heat for class IX students and to evaluate its effectiveness.

**Methodology:** For this experimental study, 200 students of Bombay and Greater Bombay were selected.

**Findings:** Students took more interest in studying through programmed learning. They found it easy and interesting as it enabled them to study at their own pace.

Choudhary, M. (1982), *Teaching Geography at Middle Level through Programmed Learning*.

**Objectives:** To construct geography course through programmed learning and to test its effectiveness.

**Methodology:** It was an experimental study consisting of 300 students: 223 males and 77 females studying in class IX and X in schools of Firozabad.

**Findings:** Programmed learning was found effective for both rural and urban areas’ students. Girls performed better than the boys.

Hamadanizadeh, J. (1980). *The Systems Approach to Teaching Calculus*

**Objective:** To discuss the concept of systems approach and to apply it to the teaching of calculus.
Methodology: This study can be categorized under curriculum development studies which follow the method of descriptive research.

Findings: This paper describes how the systems approach to teaching mathematics (SATM) can be used in teaching undergraduate calculus. A proposed way of implementing this method in the first-year calculus course through multidisciplinary means and suggested guidelines for preparing the content of the learning units appear along with a proposed programme of further study and experimentation, estimating the cost and manpower needed for using this method on a large scale. The investigator has asserted that the learning units developed using systems approach can transform lecture sessions of the usual (lecture recitation) method to learning sessions and also increase the student's learning and interest in educational organization.

2.1.2 Critical Overview of Research Literature related to Systems Approach and Allied Concepts.

The review of research literature related to systems approach and allied concepts reflects that systems approach is spoken of as a tool useful to understand any kind of system and to bring about holistic improvement in it (Checkland, 1999). A systems-thinking approach involves refocusing our understandings from objects to relationships, from contents to patterns, from structures to processes, from individuals to communities, and from microcosms to macrocosms (Llewellyn, 2008). Sterman (1994) explains that “the development of systems thinking is a double-loop learning process in which a reductionist, partial, narrow, short-term view of the world is replaced with a holistic, broad, long-term, dynamic view and then redesign our policies and institutions
accordingly.” New paradigm (ecological or holistic) has brought systems thinking into lime light (Capra, 1997). It is being hailed as a panacea for all the problems and referred as an untapped potential with its significant importance in the educational sphere (Bary, 1994; Senge, 2002). Systems approach has been extensively used in management sciences also (Black, 2008; Capra, 1997). Similarly, a number of studies have been reported employing systems approach in many fields including social sciences , medicine, psychology (Witherington, 2007), engineering (Land, 2003) and mathematics (Hamadanizadeh, 1980). However, little is known about systems approach in the context of science education for raising spiritual and emotional intelligence of students, as researcher could not find such studies.

Regarding students’ learning, it has been reported that there could be many reasons of having difficulties in understanding principles, theories, laws, concepts, etc. Though, learning theories relate the difficulties to the learner's intrinsic ability, some studies reflect that difficulty lies in thinking in organizational levels, therefore, it seems that apart from causes of difficulty which are intrinsic to learners, the multileveled nature of the systems also add to the learning difficulties. In this regard, Assaraf and Orion (2004) point out the fact that students have difficulty to deal with the complex systems at all levels. They relate this difficulty to students’ inability to understand the operations at microscopic and macroscopic level which means that students find it difficult to move across the organizational levels. Knipples (2002) also used systems thinking in teaching genetics and pointed out the inability of students to link across the organizational level and regarded it to be a cause of incoherent understanding. Similarly, Verhoeff (2003) applied systems thinking in teaching cell biology and noted students' inability to
understand the structural and functional processes at horizontal and vertical levels. It seems that organizational levels of systems are difficult to understand if knowledge is imparted in fragments without showing links across the levels. Therefore, instructional material based on systems approach has been reported useful in developing students understanding.

Some of the studies (Kalie et al. 2003; Assaraf & Orion, 2005; Verhoeff, 2003; Knipples, 2002) conducted by different people, with reference to the development of systems thinking and enhancing student's understanding, in varied disciplines in different parts of the world, maintain that systems approach plays an important role in improving the understanding of students in their particular subjects.

Similarly, Laszlo (2002), a systems theorist, advocates systems approach as a methodology of ‘seeing things whole’ for sciences (cited in Gulyaev et al., 2002). It has been found that systems approach can also be applied for developing systems thinking skills. Knipples (2002) and Verhoeff (2003) used systems thinking as an instructional tool to develop students understanding. The result of their studies showed that efforts to develop systems thinking as well as to use systems thinking as a teaching tool, in both cases students’ understanding improved. These results indicate that systems thinking can be employed as a cognitive tool for learners and instructional tool for teachers.

Certain facts or characteristics about systems thinking are also reported in literature. For example, systems thinking is considered as a higher order thinking skill required in scientific, technological and everyday domain. Apart from this, it is also reported that it is not a general ability and regarded as a set of abilities, not a single ability (Kali et al. 2003; Assaraf & Orion, 2004). In addition, some studies (Ossimitz,
1994; Klieme & Maichle, 1991) addressed the issue of developing and measuring system thinking in school environment (cited in Ossimitz, 2000b). It has also been reported that development and measurement of systems thinking is a difficult task but it is possible to construct indicators for measuring the development of systems thinking. It has been reported that it is important to have an appropriate instruction along with the cognitive ability to enhance the systems thinking for augmentation of learning (Assaraf & Orion, 2004).

It is assumed that systems thinking might be an inherent ability, and therefore, students might be somewhere on systems thinking continuum (Kalie et al., 2003). It is also assumed on the basis of previous studies that systems approach based method of instruction will have a considerable effect on the development of systems thinking skills. It is also reported that 'initial cognitive potential' influences the development of systems thinking but instructional design and strategies also have an effective role to play (Kalie et al., 2003).

As mentioned earlier that systems thinking has been used in many fields but there is dearth of such studies in science education with reference to spiritual and emotional intelligence. Although, some studies on the development on systems thinking and enhancing understanding in science education have been mentioned in the literature. However, very little has been reported with reference to systems approach at secondary level. Similarly studies on systems approach and systems thinking in relation to the teaching of physics are nearly non-existing. Therefore, assuming that systems approach based resource material and learning-teaching strategies will enhance the understanding
of secondary school level science stream students in physics, the present study was pursued by the researcher.

2.2 Review of Research Literature related to Spiritual Intelligence

Review of research literature related to spiritual intelligence was conducted to develop a critical and reflective insight regarding the perspective about spiritual intelligence pervading its field of research.

2.2.1 Studies related to Spiritual Intelligence

This section throws light on the studies on spiritual intelligence related to its concept, model and measurement.

Attri, R. (2012). *Spiritual Intelligence: A model for inspirational Leadership*

**Objective:** To study the importance of Spirituality.

**Methodology:** In this paper the researcher has followed descriptive method dealing with the importance of practising spirituality at workplace to progress from cognitive intelligence to emotional intelligence and ultimately to spiritual intelligence which acts as a catalyst for inspirational leadership and management excellence.

**Findings:** There is a ripple effect within the spiritual worker that starts with internal changes and expands through "connection with empathizing colleagues" to "team performance, which is expressed in increased support, elevated trust, and enhanced understanding," ultimately leading to "a greater degree of responsibility and ownership, as well as awareness of the bigger picture." The outcomes to this sequence include greater output, better organizational performance, and increased job satisfaction.
Objective: To propose a new definition of problem solving that can manipulate spiritual aspects of the problems and conform to the requirements, conditions and capacity of Spiritual intelligence models.

Methodology: The researchers have used introspection method and creative reasoning because S-intelligence emerges as consciousness that evolves into an ever-deepening awareness of matter, life, body, mind, soul and spirit.

Findings: S-forms of problem solving that can be used appropriately and effectively in various non spiritual Contexts. S-intelligence can be used to solve Artificial Intelligence problems. Significantly, S-resources would be less appropriate or useful for problems as mathematical formulae. S-intelligence has the abilities and competencies for every personal and social problem without limitation, which is the constituent of a person's knowledge base or expertise. Difficult situations need S-intelligence capacities for simplifying or solving the problems. The valuation problems that are defined in the PSP (Problem Solving Process) can now be expressed at PSPSI and solved by S-intelligence strategies. There are general approaches in S-intelligence as PSP and realized some effective parameters of S-intelligence that help to increase the power of a traditional PSP. PSPSI can be enhanced by a process that involves completing or making whole of the objects and is affected by bringing together a variety of aforementioned insights.
Green N.W., Noble D.K., et al. (2010). *Fostering Spiritual Intelligence: Undergraduates’ Growth in a Course about Consciousness*

**Objective:** To study the intellectual and personal effects by integral approach for undergraduate students who were enrolled in an Honors course about consciousness at the University of Washington during Winter Quarter 2008.

**Methodology:** Integral approach: All students who enrolled in it (n = 24) were invited to participate anonymously and voluntarily in this study and based on their efficiency in participation the study was carried out.

**Findings:** The results from this study indicate that there were two principal effects: students’ beliefs about consciousness and reality became more transcendent; and students became more open-minded, more introspective, and more aware of their conscious and unconscious assumptions about consciousness and reality. What are the implications of these results for the discourse about spirituality in higher education and the fostering of spiritual intelligence? After studying consciousness for 10 weeks, participants were more willing to engage with controversial and often contradictory theories about consciousness, and they brought a greater depth and breadth, both intellectually and emotionally to this conversation. They became more open to a wider range of ideas, more tolerant of ambiguity and uncertainty, and more confident about challenging their own beliefs as well as each others’.

**Objective:** To assess Spiritual and Religious Sentiments which represent spirituality as a universal source of motivation.

**Methodology:** The researchers have made use of psychometric analysis method and collected and interpreted the data for same

**Findings:** The psychometric qualities of the ASPIRES was examined within a diverse religious sample from Sri Lanka. The results demonstrated the structural validity and applicability of the measure within this ethnic group. The data provided further support for cross-cultural applicability of the instrument and for the assumption of spirituality as a universal aspect of the human experience. The authors found that those interested in using the ASPIRES would do well to either only employ the overall total Spiritual Transcendence Scale score or to omit including Connectedness.


**Objective:** To study the influence of emotional and spiritual intelligence from the national education philosophy towards language skills among secondary school students.

**Methodology:** This study is based on descriptive method and questionnaire introduction to students to assess their emotional and spiritual intelligence.

**Findings:** It was found that high level of emotions and spiritual intelligence will influence and cause high affects of language use achievement. In contrast, a low level of
emotional and spiritual intelligence will lead to a low achievement of the students. With a high emotional and spiritual intelligence, students will not only be able to use language well but also could control themselves from doing something against the law or discipline which is needed to be followed. This will decrease discipline problems which have always been related to school students. High emotional and spiritual intelligence will also ensure a student to think logically and use his or her mind the best way possible. This could be seen when the student has a high motivation and self awareness. This will also indirectly encourage the students to study hard to excel not only in their studies but also in their life.


**Objective:** To propose a viable model of spiritual intelligence and prepare a self report for its measurement.

**Methodology:** The researchers have applied correlation analyses and used intelligence criteria and current psychometric standards (the capacity for transcendent awareness, spiritual states of consciousness; the ability to sanctify everyday experiences; the ability to utilize spirituality to solve problems, virtuous behaviours).

**Findings:** *For Viable Model (study I)*

Descriptive statistics and response distributions were first examined for 84 items. Although none reached significance, slight skewness was observed for 15 of the items, which were deemed good candidates for removal. Alpha was .97 due to which very high internal consistency and reliability was noticed. The average inter-item correlation was .30, which falls in the suggested range of .15 to .50.
For the measurement of Spiritual Intelligence

Descriptive statistics and response distributions were first examined for the 42-item pool. No items displayed significant skewness or kurtosis. Alpha for the Spiritual Intelligence Self Report Inventory -42 was .96, which reflects observations in Study. The average inter-item correlation was .36. Correlations with established psychometric scales have supported convergent, divergent, and criterion-related validity.

Amram Y., et al. (2007). The Seven Dimensions of Spiritual Intelligence: An Ecumenical, Grounded Theory

Objective: To develop an ecumenical grounded theory of spiritual intelligence (SI) based on thematic analysis.

Methodology: Using grounded theory (Glaser & Strauss, 1967; Glaser, 1992; Strauss & Corbin, 1990), 71 interviews were conducted with subjects designated as spiritually intelligent by their colleagues. Seven major themes were: Consciousness, Grace, Meaning (Experiencing significance in daily activities through a sense of purpose and a call for Service), Transcendence, Truth, Peaceful surrender to Self and Inner-Directedness.

Findings: These themes appeared consistent with the teachings of most spiritual traditions with the following exceptions: (a) a subset of some non-dual participants objected to the wording of themes that implied personal agency but agreed to the qualities presented as spontaneously arising with growing spiritual maturity or self-realization; (b) a few Buddhists objected to the qualities of hope and faith as aspects of SI because they associated them with the effort to escape from reality. While these themes were listed linearly as if they are independent dimensions of SI, they in fact often
related, built on and lead to each other. An ecumenical theory of SI does not necessitate such unified cosmology; at the same time, it does suggest that most spiritual and wisdom traditions cultivate a universal set of qualities that are adaptive, i.e., increase functioning and wellbeing. People are capable of experiencing existential meaning, developing refined consciousness, living in grace, love and reverence for life, being curious and open to truth, and attaining peacefulness, wholeness, and inner-directed freedom.


**Objective:** To make a systematic review of recent researches on adolescent religiosity/spirituality and mental health.

**Methodology:** The researchers have made correlates of adolescent religiosity/spirituality and mental health and on that basis have analyzed and interpreted.

**Findings:** There is accumulating evidence that religiosity/spirituality (R/S) are important correlates of mental health in adult populations. The purpose of this article is to report on a systematic review of recent research on the relationships between adolescent R/S and mental health. Most studies (90%) showed that higher levels of R/S were associated with better mental health in adolescents. Institutional and existential dimensions of R/S had the most robust relationships with mental health. The relationships between R/S and mental health were generally stronger or more unique for males and older adolescents than for females and younger adolescents.

Objective: To study the significance of Spiritual intelligence for mature leadership.

Methodology: The Researcher has conducted this study based on daily life experiences and situations.

Findings: It is the leader at the highest stages of adult development who is best prepared to cope effectively with the life conditions we face. It is the Yellow/Turquoise (Strategist, Magician, Ironist) leader who will be able to navigate the difficult times, to encourage and inspire others, to speak so they can be heard, and to stay peaceful in the midst of it all. These people will have spiritual intelligence—since the skills of spiritual intelligence are intricately linked to the higher stages of development. Such leaders will be able to act with love (Wisdom and Compassion). Mature leadership, high SQ leadership, is not about warm and fuzzy feelings. It is deep compassion manifesting in wise action. It is a profound personal integrity—an alignment with purpose and values. The high SQ leader understands the natural emergent processes at play and can work with them for the best outcomes, all while he/she stays focused on the big picture, remaining untriggered by old egoist reactions. But developing spiritual intelligence is a requirement if we want to access the highest stages of adult development and become truly mature leaders – leaders ready for the challenges we face.

Selman V., Selman R.C. et al. (2005). Spiritual-Intelligence/-Quotient

Objective: To study Spiritual-Intelligence/-Quotient with its three different kinds of neural structures—mental, emotional and spiritual.

Methodology: The researchers have used experimental method based on neural scans.
Findings: Spiritual Intelligence can be thought of as a super-process integrating stimuli to the left- and right-brain hemi-spheres—with perspectives that cross-cue each other, as well as question the meaning of the present situation. A high SQ is the best predictor of happiness, serenity, good self-esteem and harmonious & loving relationships. Unlike IQ, however, which is linear, logical, quantifiable and rational, SQ cannot be quantified. It requires us to face choices and to realize that sometimes the right choices are difficult ones. High SQ demands the most intense personal integrity. It demands that we become aware of and live out of that deep centre of ourselves that transcends all the fragments into which our lives have shattered. It demands that we recollect ourselves, including those parts of ourselves that it has been painful or difficult to own. But most of all, high SQ demands that we stand open to experience, that we recapture our ability to see life and others afresh, as though through the eyes of a child, to learn how to tap into our intuition and visualization, as a powerful means of using our inner knowing to make a difference.

2.2.2 Critical Overview of Research Literature related to Spiritual Intelligence

In 1983 Howard Gardner introduced his theory of Multiple Intelligences for describing comprehensively all mental capacities possessed by human beings (King, 2008c). Zohar and Marshall (2008a) created the term Spiritual Intelligence (SI) in 2000, and since then, there have been a number of studies on spiritual intelligence during the last few years. Research literature (King, 2008a; Amram, 2007; Wolman, 2001; Emmons, 2000) reflects that various models and theories of spiritual intelligence have been proposed. The model proposed by King et al. (2009) consists of four core components: (i) Critical Existential
Thinking; (ii) Personal Meaning Production; (iii) Transcendental Awareness; (iv) Conscious State Expansion. Amram in 2007 has identified seven major themes of spiritual intelligence, which are: meaning, consciousness, grace, transcendence, truth, peaceful surrender to Self, and inner-directed freedom. He has developed an Integrated Spiritual Intelligence Scale consisting of 22 subscales organized into five theoretical domains of consciousness, grace, meaning, transcendence, and truth (Amram & Dryer, 2007). Wolman (2001) has stressed phenomenological experience as a critical component of spiritual intelligence.

SI is emerging as a foundational skill for successfully meeting the challenges, and embracing the opportunities of 21st century living. It has been described as the ability to behave with wisdom and compassion, while maintaining inner and outer peace regardless of the situation (Wigglesworth, 2006). King (2008b) has demonstrated that underlying human spirituality, there is indeed evidence of a set of adaptive, cognitive capacities unique from other manifestations of human intelligence, and that these capacities constitute SI.

Reflecting on the significance of SI, Selman (2005) has hailed it as the meaning giving, contextualizing and transformative intelligence. Spiritual Quotient is beyond IQ and EQ. It can develop our capacity for vision, meaning, and value, our dreams, our happiness, our intuition, our beliefs and our subsequent actions. SI facilitates dialogue between mind and body; between reason and emotion (Selman, 2005).

For Amram (2007) SI is a new construct formed by the combination of spirituality and intelligence. Differentiating between spirituality and religiosity, Emmons (1999) view is that spirituality refers to the search for, and the experience of elements of the
sacred, meaning, higher consciousness and transcendence, SI entails the abilities that draw on such spiritual themes to predict functioning and adaptations, and to produce valuable products and outcomes (Amram, 2007). According to King and DeCicco (2009) spirituality is regarded as ‘the personal quest for understanding answers to ultimate questions about life, about meaning and about relationship to the sacred or transcendent’. These research findings reflect that SQ / SI indicates how we are using mental abilities for dealing with daily life issues, our value systems, our social, spiritual, personal interactions, etc. It seems to incorporate wisdom into our thinking process. Spirituality is not just related to realization of Ultimate Reality, if that will be the criteria, then most of us will be considered as non spiritual, but, it is also related to our faith in God, or some Supreme Power, or Supreme Reservoir of energy. The stronger this faith, the closer we are to spirituality. Based on this assumption, in the present study an attempt has been made to raise and assess spiritual intelligence of secondary school science students through the incorporation of principles of systems approach to teaching.

2.3 Review of Research Literature related to Emotional Intelligence

In this section the researcher has attempted to elaborate the concept of emotional intelligence and its modes of measurement through the following studies related to this field.

2.3.1 Studies Related to Emotional Intelligence

Some of the studies related to emotional intelligence reviewed have been reported briefly in this section.
Petrides, K.V. (2011). *An application of Belief-importance Theory with Reference to Trait Emotional Intelligence, Mood, and Somatic Complaints.*

**Objective:** To apply belief importance theory with reference to trait emotional intelligence, mood, and somatic complaints.

**Methodology:** The researchers have used Descriptive method to describe basic principles of belief-importance (belimp) theory and tested them in two empirical studies. Belief and importance are conceptualized as two coordinates, together defining the belimp plane. Four distinct quadrants were identified within the belimp plane (Hubris, Motivation, Depression and Apathy), broadly corresponding to the personality dimensions of trait emotional intelligence, conscientiousness, neuroticism and introversion.

**Findings:** This paper introduced the basic principles of belief-importance theory, many of which it also tested empirically in two studies. Three different conditional planes were used (financial security, appearance, and popularity) yielding consistent results and supporting the clear majority of hypotheses. While most hypotheses were corroborated, it was worth noting that there were virtually no significant differences between Hubris and Motivation or between Apathy and Depression. This was mainly due to the choice of criteria that were not specifically selected to elicit such differences. Other criteria or life domains were better discriminators of these quadrants. Belimp theory made it possible to complement synonym-driven descriptions of the effects of personality traits on behaviour with process-focused explanations.
Rooprai, K. Y., Kumar, S. (2009). *Role of Emotional Intelligence in Managing Stress and Anxiety at Workplace*

**Objective:** To examine the need of the relationship of emotional intelligence as an overarching concept to the Management of Stress and Anxiety.

**Methodology:** The researchers conducted study on 120 Management students. Emotional Intelligence Scale, Stress Inventory and General Anxiety test were used for the measurement of all the variables. Descriptive statistics, Correlation and Regression analysis were used for data Analysis.

**Findings:** There was a significant relationship between Emotional Intelligence and the variables of Stress and Anxiety. Stress management component and anxiety component; emerged as statistically significant with respect to the relationship with Emotional Intelligence. The hypotheses of the present study i.e., the emotional intelligence correlated negatively with stress and anxiety, and Emotional intelligence predicted through levels of Stress and Anxiety, was partially conformed. The low and high level of Emotional Intelligence established relationship to some extent with stress and anxiety. Negative correlation of Emotional Intelligence with stress and Anxiety highlighted that emotional intelligence proved helpful tool in dealing with stress and anxiety at workplace.

Parker, J. D. A., Hogan, M. J., et al. (2006). *Emotional Intelligence and student retention: Predicting the successful transition from high school to university.*

**Objective:** To examine the relationship between emotional intelligence and academic retention.
**Methodology:** Participants were selected from a sample of 1270 young adults (368 men and 902 women) making the transition from high school to university. They were recruited during the first week of classes in their first year at the university and completed a measure of emotional intelligence. Participant’s academic progress was tracked over the course of year and students were divided into two groups. The first group consisted of students who withdrew from the university before their second year of study (N = 213); the second group consisted of a matched sample (on the basis of age, gender and ethnicity) of students who remained at the university for a second year of study (N = 213).

**Findings:** Results revealed that students who persisted in their studies were significantly higher than those who withdrew on a broad range of emotional and social competencies.


**Objectives:** To examine the role of emotional abilities in social functioning.

**Methodology:** Self-ratings were assessed in ways that mapped onto the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), a validated performance measure of EI.

**Findings:** In study 1, self-ratings and MSCEIT scores were not strongly correlated with perceived social competence after personality measures were held constant. In study 2, men’s MSCEIT scores, but not self-ratings, correlated with perceived social competence after personality measures were held constant. In study 3, only the MSCEIT predicted
real-time social competence, again, just for men. Implications for analyzing how emotional abilities contribute to social behaviour were discussed.


**Objectives:** To examine self-talk, year of university study, and gender as predictors of emotional intelligence.

**Methodology:** A diverse sample of 126 undergraduate participants (42 male, 84 female) was selected to collect data by making them complete self-report questionnaires on self-talk and emotional intelligence.

**Findings:** The results indicated that year of study self-talk were significant predictors of emotional intelligence and were associated with emotional intelligence in a positive direction. Contrary to expectation, gender was not a significant predictor.


**Objectives:** To examine how culturally relevant variables, including universal-diverse orientation (UDO), an attitude characterized by awareness and acceptance of similarities and differences between self and others, and emotional intelligence, the ability to accurately monitor emotions, might be related to empathy.

**Methodology:** Two-hundred-and-eleven counseling graduate students completed measures of these variables as well as a demographic sheet.
Findings: Hierarchical regression analyses indicated that UDO and emotional intelligence, along with gender, significantly explained variance in empathy.

Goyal, A. (2006). *Emotional Intelligence and Social Intelligence as Determinants of Academic Achievement at University Level.*

Objectives: To study the relative contributory role of emotional and social intelligence determining academic achievement of female students at university level.

Methodology: Using the Ex-post-facto method, the study was conducted on 120 female teacher-trainees doing B.Ed. from DEI.

Findings: Emotional Intelligence and Spiritual Intelligence both play very important role in determining academic achievement of students at university level.


Objectives: To estimate the relationship between emotional intelligence and academic achievement of pupil teachers.

Methodology: This study was confined to 100 B.Ed. students getting teacher-training in the Faculty of Education, DEI.

Findings: The findings suggest that the pupil teachers, either male or female have control over their emotions. There exists no significant difference in academic achievement of pupil teachers either male or female. The relationship between emotional intelligence and academic achievement of pupil teachers is highly positive, which means more emotionally competent pupil teachers will be more academically sound.

**Objectives:** To examine whether perception of novel emotions along with perception of novel objects, elicits a cardiac orientation reaction.

**Methodology:** Using a habituation-dishabituation paradigm, data from 11 adult subjects showed that orientation to both novel emotions and novel objects elicited a heart-rate deceleration.

**Findings:** Results suggest that the orientation reaction may be an integral part of emotion. Perception of emotions, therefore, is a complex, multistep process that includes an early orientation reaction.


**Objectives:** The objectives of the investigation were to study the relationship between emotional intelligence and spiritual intelligence of high and low achievers.

**Methodology:** The study was conducted on 200 male students of Intermediate colleges of Mathura using descriptive survey method.

**Findings:** High achievers were found to have high spiritual intelligence and high emotional intelligence.


**Objective:** To study emotional intelligence and implications for its correction.
Methodology: The researchers have constructed Emotional Intelligence by reviewing the different models of the construct, the measures used to assess them, and the relationship between these models and other similar constructs.

Findings: Three competing models of emotional intelligence (Reuven Bar-On Model, Mayer & Salovey’s Model, Goleman’s model) have emerged along with their own corresponding measurement strategy. While the pure model emphasizes cognitive ability and relies on an objective, performance-based measure of E.I., the mixed models assess both cognitive ability and personality traits using self-report measures. Interestingly, although Multi-Health Systems has published two E.I. measures (one derived from the 'pure' model, the other from the 'mixed' model) considerable debate remains regarding the legitimacy of the construct and how it should be measured. Consequently, additional research is needed to gain not only theoretical consensus but also clarity regarding the most appropriate measurement strategy. Lastly, the effectiveness of E.I. training and E.I.-based hiring has been examined in applied settings. However, the extent to which a correctional environment, specifically Correctional Service of Canada could benefit from hiring individuals who already possess a high level of E.I. or alternatively, training existing staff to become more emotionally intelligent remains to be examined.


Objectives: The aim of this study was to examine the possibility to measure the ability of perceiving emotions and moods in art.
Methodology: Sixty pastel paintings were selected and estimated on 151 descriptors of affective states. A factor analysis based on the painter’s ratings of the affective states resulted in three factors: negative affection, positive affection and activation. Loading of these three factors together with test-retest reliabilities permitted a reduction to 12 pictures and 20 descriptors.

Findings: High agreement was obtained between the painter’s ratings and the ratings of twelve art experts. It also indicated the importance of developing a test of emotion perception based on art work.


Objectives: To study the mediating effect of emotional intelligence on the relationship between the social intelligence and team playing behaviour.

Methodology: The sample consisted of 75 managers and professionals in an executive MBA course. The criterion related and construct validity of the social intelligence was examined.

Findings: Both the SI and cognitive ability had predictive ability for the academic performance of managers and professionals in an MBA course. Only the SI predicted team playing behaviour assessed by peers ($r = 0.32$, $p = 0.05$) was found significant, the correlation between the SI and cognitive ability was not significant. Emotional intelligence completely mediated the relationship between the SI and team-playing behaviour.

**Objectives:** This study examined daily emotions and social contexts of young adults who differed in global attachment style (secure vs. insecure).

**Methodology:** Sixty-nine college students (41% male, 59% female) completed self-report measures of attachment and provided time sampling data on moods, companionship and activities using the experience sampling method.

**Findings:** Secure participants were more likely to report extreme positive emotions, and insecure participants were more likely to report extreme negative emotions, especially when they are alone.

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**Shilpi, (2003). A Study of the Relationship between Traditional Intelligence and Emotional Intelligence of the Teacher-Trainees.**

**Objectives:** To study the relationship between traditional intelligence and emotional intelligence (EQ) score of teacher-trainees.

**Methodology:** The study was conducted on 452 teacher-trainees using descriptive survey method.

**Findings:** IQ scores were found normally distributed. EQ scores were not found normally distributed. The distribution of scores of EQ was found with negative skewness. The negative skewness reflects that teacher trainees high control over their emotions. Male teacher-trainees were found to have high IQ. Male and female teacher-trainees both have high Emotional Quotient.

**Objectives:** To study the relation between emotional intelligence and technical proficiency among the top executives of public undertakings.

**Methodology:** The study was conducted on 68 top executives of three public sector companies located in the Gujarat states.

**Findings:** The research suggests that a technically proficient executive or a professional with high emotional quotient is someone who picks up readily with more depth and more quickly than others.


**Objective:** The purpose of study was to cope with the massive change involved in the ability to perceive and understand the impact of emotional aspect of change on the individual and the groups.

**Findings:** Emotional intelligence is important for the job and work situation that play a significant role in organization effectiveness. The practical implementation of emotional intelligence calls for better understanding of different personalities. Hence an attempt has been made to measure emotional intelligence with reference to potential technocrats and managerial aspirants.
2.3.2 Critical Overview of Research Literature related to Emotional Intelligence

Although, research in the field of EI started in early 1990s, but, it got popularized only after the publication of Daniel Goleman’s book, *Emotional Intelligence: Why it can matter more the IQ* in 1995. In recent years, emotional intelligence (EI) has been a popular topic of discussion in the field of management (Rooprai, 2009; Bracket et al., 2006; Nustad, et al., 2003; Sudhaker and Venkatapathy, 2003). Goleman (1998) asserts that emotional intelligence, not IQ, predicts workplace success. It has been praised as a successful predictor of job performance and leadership ability. Authors have also claimed that emotional intelligence predicts success at school (Parker, 2006; Goyal, 2006; Saxena, 2006; Bansal, 2005).

*Emotional Intelligence* has been defined differently by different scholars. For some it is the ability to perceive and express emotions, to assimilate emotions in thought, understand and try to help regulate emotions and feelings of self and others (Mayer, Salovey, Caruso, 2002), whereas, for others EI consists of intrapersonal aspect, the aspect of interpersonal, adaptability, stress control and general mood (Reuven Bar On, 2000) and some others believe that EI consists of constructs such as: self-awareness, self-control, motivation, empathy and social skills (Goleman, 2001). The Researchers have constructed Emotional Intelligence by reviewing the different models of the construct, the measures used to assess them, and the relationship between these models and other similar constructs (Reuven Bar-On Model, Mayer & Salovey’s Model, Goleman’s model).

Based on the review of related literature it can be said that Emotional intelligence (EI) is the ability to identify, assess, and control the emotions of oneself, of others, and of
groups. Various models and definitions have been proposed of which the ability and trait EI models are the most widely accepted in the scientific literature. Ability EI is usually measured using maximum performance tests and has stronger relationships with traditional intelligence, whereas trait EI is usually measured using self-report questionnaires and has stronger relationships with personality. Considering the importance of emotional intelligence in personal and social lives, the present study has focused on its enhancement in secondary level students, and its subsequent measurement.

2.4 Conclusion

During the process of conduction of the present research, the researcher explored and collected numerous research literature related to the field of the study. Some of the reviewed studies related to systems approach, spiritual and emotional intelligence have been reported in this chapter. This rigorous review, not only enabled the researcher to understand the concepts of systems, systems approach along with spiritual and emotional intelligence, but, also guided during the construction of tools for measuring spiritual intelligence and systems thinking. The procedures of their construction have been explained in the next chapter, which also reports the entire procedure of the study (phase wise) in detail.