CHAPTER – I

INTRODUCTION

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CHAPTER-I
INTRODUCTION

1.1 BACKGROUND OF THE STUDY

“If education fails to contribute to the development of the intelligence, it is obviously incomplete. Yet, intelligence is essentially the ability to solve problems; everyday problem; personal problem…” (polya-1980).

Education acts as a powerful tool in the socio-economic transformation of a society, community and nation. It sharpens the eye of knowledge, develops awareness and makes mind logical. It is also the key to build the skills and capacity in all dimensions which are necessary for techno-economic development. Further education is the means where by people may hop to addresses some of the most profound problems confronting our society in the current century.

The task of teaching and learning of Mathematics at the school level is now more complex than ever before since its excitement and diverse possibilities must now be infused into young minds in an appropriate and dynamically evolving way. This demands that entire gamut of teaching and learning of mathematics has to change from conventional approach.
Jean Piaget’s (1973), “Every normal child is capable of learning mathematics”, has put greater responsibility on dispenses of mathematical knowledge and procedures of knowledge of mathematics education which they cannot escape by passing the buck to the poor mathematical ability of the students”.

Mathematics, by and large is taught in a stereotyped and mechanical way in schools. “experience has shown that the majority of students normally fail in mathematics at the end of class X”( NCERT).

Lack of understanding of the subject would create backwardness and phobia in the students. The result is that the students are not only scared but would also like to shun the subject. There are many reasons for the failure and backwardness in the subject, which have to be tackled from many fronts.

A.P.J. Kalam, “Teaching methodology plays a significant role in the process of education”. He advises that at primary level emphasis should be on exploration, innovativeness and creativity through activities. At the secondary level, emphasis should be on experiment, problem solving and team work, learning by doing and self observation. He adds that “self observation outside the classroom is equally important for the students of learning”.

2
Table No-1: The previous five year results of 10th standard of Karnataka State (Subject wise).

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Subject</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
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<td>91.47</td>
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<tr>
<td>2</td>
<td>II Language</td>
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<td>79.94</td>
<td>93.18</td>
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<td>88.99</td>
</tr>
</tbody>
</table>

(Source: KSEEB Website)

Even the state results also showed that Mathematics results are less compared to the other subject's results. There are many reasons for the failure and backwardness in the subject which have to be tackled from many fronts, i.e., by testing the effectiveness of teaching methods, improving the ground work techniques and using the different research outcomes, different motivation techniques to motivate the learners.

Instructional strategies occupy an important place in teaching and learning process of mathematics. Several studies have been conducted in this area such as Singh(1992) found that computer assisted instruction was always superior, Nager (1988) found that mathematics could be taught more effectively through use of computer assisted programme. Rao (1988) and Prabha (1992) have found that programmed learning in mathematics to be superior to the conventional method of learning. Rao (1986) found no difference in the effectiveness of guided discovery and expository techniques.
of teaching mathematics of class 9th students. But Nelson (1973) found that the expository method to be significantly more effective than the discovery method on the criterion of ability to infer mathematical concepts.

Srivastava (1974), pointed out that students having negative attitude towards school are ones who became truant, careless, less playful and less thoughtful.

On the other hand, Monoya (1984) Miyon (1982) and Nanitha (2000) found the discovery method to be better than the expository method and Narayanan (1990) found guided discovery to be better than learning by repetitions.

Hence, computer assisted instruction, programmed instruction, discovery method ... are to be preferred in teaching mathematics in class room situations.

Developing attitudes towards their subject was found to be an important input in the learning of mathematics. Kapur (1997) opines that through improving attitudes of students towards mathematics, their achievement in the subject could also be improved. Rosaley (1992) found that the attitude of high school students towards the learning of mathematics and their achievement in mathematics are highly correlated. Hainathan (1992) similarly found that high
school students who has positive attitude towards mathematics has better 
achievement. Pal(1989) and Jain(1979) also found that the attitude towards the 
subject taught played a vital role in its achievement.

Mathematics learning involves making connections between concrete 
mathematical experiences and abstract thinking processes. According to 
Edward’s(1998) in order to make connections between concrete mathematical 
experiences and abstract thinking processes, one should have skill in handling 
objects, language understanding, picture and symbols.

The important thing is the process of structuring of mathematical 
learning should not follow a strictly hierarchical sequence but embrace a 
etwork approach, where new learning is built on what children already know 
(Denvir and Brown 1986)

The nation’s educational aim and objective to which its philosophy of 
education is linked include among others, the acquisition of appropriate skills, 
abilities and completeness both mental and physical as equipment for the 
individual to live in and contribute to the development of the nation.

Thus the system gives much importance to the study of mathematics. 
Mathematics rightly described as the queen of all the sciences has a major role 
to play in study science and technology.
1.2 NEED AND IMPORTANCE OF THE STUDY:

“One fundamental task of effective schooling is to enable an individual student to become active learner who assumes responsibility for acquiring knowledge and skills and sustain a pattern of self directed, life long learning”. (Wang and Penerlily 1987)

Educationists have tried a number of learning approaches to enhance learning of students and some of them have been more effective than others. Among the learning approaches used were, individual learning, peer tutoring, paired learning, collaborative learning, mastery learning and co-operative learning.

Forman (1989) found that children could take an active role in discovering and applying mathematical concepts in his study. Butler and Winne (1995) found that self regulated students are aware of guidelines of their own Knowledge, beliefs, motivation and cognitive processing.

In traditional approach teacher teaches students through a method of lecturing, and ask the students to perform various activities in accordance with the requirement of subject. The most prevalent practice in class room is to make students passive participants and rarely do they get opportunities to express their feelings. Students are not encouraged to ask questions and they
have to listen to what the teacher says. Teachers ask students to memorise the answers to the questions from books and write them down on their note books.

As a result of this practice, learning becomes boring and students study for the sake of passing examination than learning the subjects. Passive learning makes it difficult for student to develop necessary competencies that are expected of them. Teacher dominates the classrooms and there is no opportunity for the development of creative and critical thinking among students.

Another feature of traditional learning approach is that it promotes learning of bright students only and students with learning difficulties, sensory handicaps and physically challenged cannot learn in the regular classroom and their presence in the classroom would hamper the learning of other students.

Lim, Engleheng (2002) studied the extended effects of an instructional program designed to enhance schema development by using non goal specific problems in the teaching of geometry to high school students, need of remedial situation made greater improvement in solving problems more faster, efficiently and accurately.

Wong, Regina M.E, Lawson et.al, (2002) studied the performance of a group of mathematical students trained to use self explanation procedure during
study of a new theorems in geometry was compared with traditional method of teaching,

Montague, Majoric et al (1986) investigates the effect of an 8-step cognitive strategy on verbal math problem solving performance and found that cognitive strategy training to improve the verbal math problem solving.

Kumari Ume (1993) tested various methods of problem solving with guided discovery. Ahn Doche (2001) studied about facilitation Mathematical problem solving skills via computer. Much work has been done by the researchers regarding children’s poor performance in Mathematics. Research has evidenced that differences in Mathematics achievement begin to appear at elementary level and perpetuate throughout the school years. Probably, a large number of students have rarely understood mathematics in its right perspective and meaning. Learning to think mathematically involves a great deal more than having large amount of knowledge. It rather includes a flexible spectrum of learning that promotes mathematical thinking which subsequently crystallizes into individuals’ performance in Mathematics.

National Policy on Education (1986) advised, “Mathematics should be visualized as a vehicle to train the child to think, reason, analyse and to articulate logically”.

But the regrettably, majority of school students are quite opposite to the said expertise. Apologetically the roots of the tragedy lies in the structure of how mathematics is taught.

It has been recognized that all students can learn if classrooms are suitably modified and the appropriate learning approaches are used. The classroom environment must cater to learning needs of all students and it should promote values like friendship, cooperation, sharing experiences, learning to live together, tolerance, compassion, equality etc...So the researcher felt that, providing more opportunities to students to participate in learning process and make learning more effective Life Skills Education is the next option,

So the Life Skills Education (LSE) approach has in built mechanism in promoting this kind of environment. A new learning approach that contains principles of encouraging students to take initiative, explore freely and take responsibility for their own learning. The purpose of the study was to compare the effectiveness of Life Skills Education on Attitude towards Mathematics, their Self Concept and their Problem Solving Ability of students of 9th standard.

Over the years, the problem of effectiveness of teaching and learning of Mathematics at various levels of education has been a matter of great concern
and has been investigated by prominent mathematicians. Such problems
include lack of professionally qualified teachers and attitudes of students
towards Mathematics.

The National Curriculum Framework 2005, recommends that the
children life at school must be linked to their life outside the school. This
principle marks a departure from the legacy of bookish learning which
continues to shape our system and causes a gap between the school, have and
community. NCF signifies an attempt to implement the idea of discourage the
rote learning and the maintenance of sharp boundaries between different
subject areas. Teacher must take to encourage children to reflect on their own
learning and to pursue of imaginative activities and questions which links with
the real life situations. (82)

To improve student's mathematical knowledge, different researchers
have been done and are being done in different areas namely content, method,
evaluation etc. But classroom teaching is the heart of the formal system of
education. So, innovations in different areas of education must have their direct
or indirect reflection in classroom interaction.

Throughout the world, Mathematics is taught as one of the subject in
schools, colleges and universities. But majority of the students feel that
mathematics is a difficult subject, which leads to high failure rate. Also,
majority of the mathematics teachers follow traditional method of instruction in schools. For effective instruction and learning, there is need to create learning settings in the classroom that will enable learners to actively participate in the process of instruction, rather than the passive listeners’.

LSE strategy can enable all the learners in the classroom to learn or work together. This can contribute to intellectual, social and psychological development of learners unlike other methods of instructions.

Although a number of empirical studies have conducted on many methods and those were adopted in their classroom settings. So the researcher proposed to study the effect of LSE on attitude, self concept and problem solving ability in mathematics of secondary school students.

The teaching of mathematics should enhance the child’s resources to think and reason to visualize and handle abstractions to formulate and solve problems, succeeds in mathematics.

1.3 STATEMENT OF THE PROBLEM

The problem of the present study is stated as

“A study of the effectiveness of the Life Skills Education on Attitude, Self Concept and Problem solving ability in Mathematics among secondary school students.”
1.4 OBJECTIVES OF THE STUDY

The study has been undertaken keeping the following objectives in view.

1) To measure the attitude of students towards Mathematics

2) To assess Self Concept of the students.

3) To measure the Problem Solving Ability (PSA) of secondary school students.

4) To adopt the Life skill programme to study the effectiveness of Life Skills Education on Attitude, Self Concept and problem Solving Ability of students of 9th standard.

5) To study the effectiveness of Life Skill Education on Attitude, Self Concept and problem Solving Ability of students of 9th standard.

6) To find the difference if any between the effect of Life Skills Education on 9th standard boys and girls, on their Attitude, Self Concept and problem Solving Ability.

1.5 HYPOTHESES OF THE STUDY:

By considering all above facts researcher intends to find the effectiveness of LSE on other variables, so he has formulated the following hypotheses.
1. There is no significant difference between mean scores of attitude towards Mathematics of secondary school students of 9th standard belonging to experimental and controlled group.

2. There is no significant difference between mean scores of Self Concept of secondary school students of 9th standard belonging to experimental and controlled group.

3. There is no significant difference between mean scores of Problem solving ability in Mathematics of secondary school students of 9th standard belonging to experimental and controlled group.

1.6 SCOPE OF THE STUDY:

The problem studied here is limited to the students who are studying in Government, Aided and Un Aided High schools of Bangalore City with English as the medium of instruction. The effectiveness of Life Skills Education on Problem Solving Ability, Attitude towards Mathematics and self Concept of students of 9th standard was found. The degree of the variation in those also been analysed to test the varied effect of input variable i.e. Modules of Life Skills.

1.7 LIFE SKILLS EDUCATION

Life Skills are ‘living skills’ or abilities for adaptive & positive behavior that enable individuals to deal effectively with demands & challenges of every day life. (WHO 1997).
SKILLS-MEANING

A skill has been an ambiguous concept which denotes mechanical skill, technical expertness or technical knowledge of the means and methods of accomplishing a task, i.e. repairing a bicycle or a motorbike or making furniture out of wood. This term has been used in education with a much broader meaning. Every curriculum framework reflects skills-related objectives along with knowledge-related, understanding-related and attitude-related objectives.

Although these objectives appear to belong to distinct categories, in reality they are overlapping categories.

However, skill has been an overworked term in education. It has been indiscriminately applied with contextual adjectives and variously referred to as mechanical skills, intellectual skills, emotional skills, perceptual skills, creative skills, language skills, 'scientific skills, mathematical skills, laboratory skills, basic skills, personal skills, people skills, and so on. These varied terms make denote the meaning of skills to be a little more than 'abilities'. Skills are competencies for continuous superior performance.

Skills, however, may be defined more precisely as capabilities that enable individuals to translate information and knowledge into specific behaviour and perform effectively in action-based situations. These are
acquired by them in their education and working life. Some skills, like holding a pen, are very simple but some like skills of a cricket player are very complex. Some skills (e.g., walking) appear to develop naturally and some (e.g. talking) do not develop automatically but through the environment. Skills such as dribbling the ball by a soccer player or driving a motor vehicle are developed through practice, whereas skills that are popularly termed as life skills, like critical thinking, interpersonal communication, negotiation are essentially the outcome of experiential learning, i.e. Understanding and observing the skills being applied effectively in the concerned context.

LIFE SKILLS - MEANING

The concept of life skills has made a very recent entry into the lexicon of pedagogy and has a specific contextual meaning. In fact, it could be found only in one of several dictionaries that were consulted. The Webster’s New Millennium Dictionary of English, Preview Edition (2003) defines life skills as “the ability to cope with stresses and challenges of daily life especially, skills in communication and literacy, decision-making, occupational requirements, problem solving, time management and planning”.

Most of the development professionals view life component in respect of health, reproductive health and certain critical, societal concerns related to environment, consumerism and peace. Within a short period the term life skill has been used in so many different ways and there by has taken so many
different meaning. That at times it seems to have lost its basic purpose for which it was conceptualized and this is reflected even in the dictionary meaning stated above. May be, the zeal to launch life skills development programme has always raced ahead of conceptual clarity. In fact, the basis of the approach to life skills development adopted in different programmes tends to be programme-driven, rather than based on the principles pedagogy. Various programmes claiming to adopt life skills approach include a number of skills that by any definition may not be categorized as life skills. Some of the educational programmes actually aim at developing certain motor skills or livelihood skills or vocational skills or even value orientation but claim themselves to be life skills based education.

Another significant use of the concept of life skills approach is it does not sound appropriate pedagogically to carve out a distinct approach for life skills development alone. It is true that the development of life skills among learners requires a transaction approach different from the commonly employed ones. A transaction approach primarily focused on experiential mode of learning is considered effective for life skills development, but it will be equally effective for the development of some other abilities as well. In fact, life skills are abilities like many other abilities and they may not regarded to constitute an approach.
Moreover, the concepts like life skills education or life skilled based education sound misnomer. It is also being promoted in response to the need to reform traditional education systems for bringing them closer to the realities of modern social and economic life, establishing an interactive relationships between-schools and the outside world. But for doing so a much broader approach frameworks, based on various theories like, Social Learning Theory (Bandura, 1977), Problem Behaviour Theory (Lessor, Donovon and Costa, 1991), and Constructivist Theory (Piaget, 1972; Vygotsky, 1978) are being tried out. Further more, the use of or a euphemism for HIV/AIDS of education or even sex/sexuality life skills education as a synonym education is simply the result of programme-driven compulsions. These are perhaps done to enhance the acceptability of these areas. Experiences have proved that this kind of effort has almost always proved counter productive and resulted into a setback.(81)

Education for life skills development has mistakenly become synonymous with participatory education or interactive teaching learning methods, whereas educational intervention for life skills development has to rely on the use of participatory adopting skills development. Any participatory and interactive activity may not necessarily develop life skills. Educational activities aimed at life skills development have to be specially designed. The entire process of such an activity has to provide opportunities and create simulated situations for skill development. For doing so it is essential to have an understanding of not only the concept of life skills in the specific approach
framework but also the process that makes a difference between organizing an interactive activity and doing so for life skills development.

LIFE SKILLS: CONCEPT

It is being widely claimed that the concept of life skills is in outcome of life skills based education approach which is an interactive educational process focused on acquiring knowledge, attitude and life skills. It is said to have emerged in the context of an educational programme operationalised as a prevention strategy against multiple types of substance abuse (Botvin, 1980-84). Since then the term life skills has been popularly used particularly in the context of health and reproductive health and HIV/AIDS (WHO, 1997 & UNICEF, 1998).

It is based on “Social Learning theory” (Bandura- 1977), according to which individuals increase their self-efficacy (ability to take control of their lives) by acquiring new knowledge and skills how to handle situations in a better manner. This learning can occur through experience, interactive learning activities and training in skills that leads to confidence building. It may also occur by observing and modeling behavior of others. All these promote opportunities for processing, structuring and actively gaining life experiences.

World Health Organization, while initiating life skills based education, conceptualized life skills as a psychological competence. Psychological competence is individual's ability to maintain a state mental well-being and
demonstrate this in adaptive and positive behaviour while interacting with others, and also with her/his culture and environment (WHO, 1997). Life skills as defined by WHO are “the abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life”. Life skills endow individuals in dealing with stresses and pressures in life and equip them well with competence to manage challenging situations. They enhance their coping resources and personal and social competencies. As a psychological competence life skills are different from other significant skills that individuals may have, such as literacy, numeracy, technical and livelihood skills.

LIFE SKILLS IN EDUCATION

There is definitely a need to contextualize the definition of life skills, otherwise any ability can be interpreted to have psychosocial orientation and grouped into the category of life skills. Life skills may be more appropriately conceptualized in the specific context of adolescence education framework that encapsulates adolescent reproductive and sexual health (ARSH) concerns, including the elements of HIV/AIDS prevention education and education in respect of drug (substance) abuse. This concept may be defined as follows:

“Life Skills are psycho-social abilities that help attain physical, mental and social well-being in respect of reproductive and sexual health among adolescents and youth, empowering them to take positive and responsible
actions to protect themselves from risky situations and to build healthy interpersonal and social relationships."

In view of the above, life skills are different from other skills primarily because the following reasons;

- Whereas other skills like mechanical skills, livelihood skills, vocational skills or language skills are technical, life skills are psycho-social competencies (personal, social, interpersonal, cognitive, affective and universal) directed towards personal actions or actions towards others;

- These are problem-specific skills where problems are related to behaviour, and where behaviour is related to an ability to deal with stresses and pressures of life; and

- Life skills are interpersonal skills empowering individuals to interact with the self as well as others and develop healthy lifestyle and responsible behaviour.

The Need of Life Skills Development in the Educational Process

It is generally argued that all educational efforts particularly those in school education inter alia focus on skill related objectives. The content and process of school education are expected to influence this process and develop skills in respect of various concerns that are transacted through different subject areas incorporated in the school curriculum. However, it is commonly felt that the transaction process of school curriculum has not been able to lay the desired emphasis on skill development and more so on life skill
development. The existing teaching-learning methods focus mainly on transmission of information, imparting of knowledge to learners. Teaching in schools all over the world tends to be didactic, by and large non-interactive and assessment-driven. In recent years, some efforts have been made sporadically to bring about the needed change in the teaching methods and make them activity oriented and "joyful". But specific pedagogical methods to actualize skill development among the learners even now remain a lively subject of Intellectual discussion and are yet to assume their rightful place in the teaching-learning process.

The following points merit consideration in respect of the urgent need to provide the needed space to life skills development in the school curriculum:

1. Education in life skills is necessary because skills in relation to everyday life form the foundation for promoting physical, social and mental well-being, healthy interaction and positive behaviour among individuals. These are expected to enable them to translate knowledge, attitude and values into actual abilities, i.e. "what to do and how to do".

2. It can influence the way individuals feel about themselves and others and also the way they think they are being perceived by others. May contribute developing among them proper perceptions of self-identity, self-efficacy, self-confidence and self-esteem.

3. It is generally believed that a person who is educated is equipped with all the needed abilities including life skills. But in reality this does not
happen. Knowing what needs to be done or knowing what needs to be changed does not mean that the learners automatically know how to bring about behaviour changes. Life skills, if properly developed provide the know-how and the tools to actualize behaviour changes.

4. As is evident from the analysis of emerging students learning problems, the young people are not adequately equipped with life skills to deal with the increasing demands and stresses they experience. In the context of the critical implications of these problems, it is necessary to enhance the ability of adolescents and the youth to take greater responsibility for their own lives by making suitable choices, acquire abilities for resisting negative pressures and avoiding risky behaviors.

5. The rapid social change, consequent upon modernization, urbanization, globalization and the media boom, has made the lives of young people, their expectations, values and outlook very different from those of older generations.

**Life skill Development: Approach Framework**

However, in order to make educational interventions effective for life skills development it is very important to adopt an approach framework that is pedagogically sound. Most of the current approaches are programme-driven and tend to be panic approach, which is why under such approach framework there is a growing tendency to consider life skills development as an autonomous process and imagine any kind of simulated situations for interactive learning without considering their actual worth. The approach
framework has to be based on an appropriate understanding of life skills development and the way it can be actualized.

It is important to note that life skills development does not mean development of skills a fresh by a set of educational interventions at a particular point of time. It may be true in respect of some of the skills like mechanical skills or soccer skills. But any specific intervention may not be attributed to the development of life skills like critical thinking skills or communication skills, because life skill development is an integral part of the all-encompassing process of socialization that continues throughout the human life. School education is an integral part of this process. In fact, individuals apply the acquired life skills in different contexts differently. For example, an individual may have acquired a life skill and she/he may also be equipped with the ability to apply that skill in a context which is fundamentally different from adolescent reproductive and sexual health. For example, an adolescent may be applying thinking skill or communication skill very effectively while interacting with her/his teacher or even peer group during a discussion on say, globalization or environmental pollution, but she/he may not have the ability to apply those skills in their learning process. Life skills development, therefore, may be more aptly defined as a process of acquiring the ability to apply conceded skills in the specific confers and not the development of that skill afresh.
The life skills approach recognizes skill development as a process of development of skill application ability. The approach framework of life skills development has the following four major strands:

**CONTEXT:** Since life skills are generic by nature, an educational intervention aimed at the development of ability to apply them may be effective only when it is focused on the specific context. The intervention may have to be designed and operationalised differently for different contexts. It needs interventions to focus on acquisition of authentic knowledge, development of positive attitude, and empowerment for learning.

**CONTENT:** The design of educational intervention has to take note of the content area and also specific life skills. Interventions to be made, need to be well conceived for doing justice to the content as well as the context and age appropriate contents having contextual relevance need to be focused. The interventions may also have to focus on the specific objectives of developing life skills. It is important to exactly identify which life skills are to be focused and also the reasons for doing so.

**ACTIVITY:** In order to organise educational interventions for life skills development effectively, it is very important to identify activities both curricular as well as co-curricular that have the potential for developing skill application ability. There can be a number of activities that may appear to be
effective in terms of skill development. But certain specific activity will be more appropriate than others in respect of a particular life skill. For example, role play can be very appropriate in respect of negotiation skills or interpersonal skills or skills related to empathy.

**PROCESS:** One activity can be organised to attain different objectives. It is the process of organizing that activity that makes a fundamental difference by providing exact direction for attaining the desired objective. Group discussion may be able to attain knowledge, understanding and even attitude related objectives, but if it is to attain skill development related objectives, it has to be planned and conducted according to a particular process that sustains its focus throughout on skill development. There is a specific need to consider the criticality of the process which has been by and large ignored in respect of life skills focused programmes. Since life skills development primarily depends through the mode of experiential learning mode, the process of involving learners in the activity is very important. A person who knows two-wheeler driving cannot drive a car, although the basic principles of driving both are the same. For doing so, the person will have to undergo an experiential learning for car driving according to a specific process. The process becomes still more relevant, when life skills development is the focus of interventions.
If one handles most of the situations successfully and confidently by using the appropriate strategy, one feels good and positive and is ready to face similar situations without anxiety.

On the other hand, failure to handle the situation makes one feel inadequate, ineffective, anxious and reluctant to face similar future challenges.

There are many Life Skills; however all of these skills fall under a set of core generic skills, which are needed for every individual.

**LIFE SKILLS EMPHASIZED BY W.H.O.**

A review of life skills education programmes suggests that life skills have not been identified in any uniform way. The Department of Mental Health (1993) in WHO has identified five basic areas of life skills that are relevant across cultures: (i) Decision-making and Problem solving; (ii) Creative Thinking and Critical thinking; (iii) Communication and Interpersonal skills; (iv) Self-awareness and Empathy; (v) Coping with emotions and Coping with stress. Subsequently, two more areas were added; (i) Teamwork and cooperation and (ii) Advocacy.

Another attempt has been made to identify three basic categories of life skills as follows:

Social or interpersonal: Communication, negotiation/refusal skills, assertiveness, cooperation, empathy;
Cognitive Skills: Problem solving, Understanding consequences, Decision-making, Critical thinking, Self-evaluation;

Emotional coping skills: Managing stress, Managing feelings, Self-management, Self monitoring.

These patterns of identification of life skills are the outcome of programme-driven approach, implemented in a project mode and hence they go on including an ever-increasing number of skills applicable to almost all aspects of life, such as cleanliness, nutrition, environment, peace and so on. Many of the abilities included in the list do not even appear to be life skills in real sense of the term. Moreover, it has to be realized that core life skills are not mutually exclusive. Decision-making and problem solving abilities may not be developed unless the person acquires critical thinking abilities.

One more consideration is significant in this regard. It may appear to be true that educational interventions for helping the learners acquire a generic group of life skills is more effective, but it is also equally true that the effort to include many life skills that are relevant for a large number of contexts tends to dilute the sharpness of interventions.

The present approach framework, therefore, contains specifically identified life skills, the rationale behind selecting those skills, and also the
detailed process of conducting curricular as well as co-curricular activities for
developing among learners the ability for life skills application. Whereas
curricular activities for classrooms may depend on the context in which the
contents providing opportunities for life skills development are integrated, the
framework includes selected co-curricular activities having greater potential for
developing abilities for life skill application.

Life skills identified and operationalised under the present approach
framework are for two distinct target groups: students and teachers.(81)

LIFE SKILLS FOR STUDENTS

The main objective of educational intervention for life skills
development among adolescent students is to enhance their coping resources
and personal and social competencies. What they need most is a critical
understanding of these issues and concerns, an ability to communicate with
others and the resourcefulness to negotiate with persons and situations. The life
skills that may be considered crucial for students, therefore, are Critical
thinking, Interpersonal communication and Negotiation skills. It does not mean
that other life skills are not important. In fact these three are being focused
particularly to enhance their ability for making decisions, solving problems,
expressing their feelings, needs and ideas to others and handling their emotions
and stress. The following three life skills being identified are two-dimensional:
critical thanking about self and others (including the issues and concerns),
communication with self and Interpersonal communication with others and negotiation with self-and with others.

**Critical thinking Skills:**

All human beings think, but all of them do not have critical thinking skills. As opposed to a general understanding, critical thinking is not necessarily being critical and negative. It is an ability to distinguish between facts and opinions or personal feelings, subjective and objective points of view, inductive and deductive arguments and judgments’ and inferences Critical thinking regarding self and others as well as issues and concerns is an evaluative thinking for making reasoned judgment, that enables individuals to decide reasonably and reflectively what to (believe and do. It helps making a Judgment based on “interpretation, analysis, evaluation and inference as well as explanation of the evidential, conceptual, methodological, criteriological or contextual considerations”.

One has to shed inhibitions and apprehensions by developing critical thinking skills. As is true about the critical thinking in respect of any other area, it cannot be developed only by exposing the learners with a heap of information. It is developed by involving the learners in a process of gathering information, understanding issues and problems, examining the alternatives, making decisions and solving problems. Therefore, the process of activities in which adolescents and young people are involved has to have sustained focus on the following abilities:
➢ To identify and recognize the critical issues and concerns and pin point those;

➢ To gather, analyse, interpret, assess and use the information effectively

➢ To determine the authenticity, accuracy and value of information and perceive the situation in totality

➢ To examine the alternatives, seek reasons and change views based on evidence

➢ To look at pros and cons of the decision they are making and refrain from making hasty, unplanned decisions.

**Interpersonal communication skills:**

Every human being expresses and shares the information, thoughts, experiences, feelings and attitudes with others through a language which takes place not only feelings tool. This is what is known as communication which takes place not only with others but also with self. The most significant quality of communication is that it connects one individual with another individual or a group of individuals. Communication is key to human relationships. It is still more critical and subtle, when one communicates with self in respect of certain issues and concerns and also in respect of others and interpersonal relationships.
But communicating with people is not an easy task and still more default is to communicate with self. To make it effective individuals need to develop certain skills. These skills are much more needed for communicating in respect of a subject like reproductive and sexual health which has been the least discussed area in almost all social settings. It is essential particularly for adolescents and young people to acquire skills for effective interpersonal communication to manage their concerns with greater responsibility and confidence especially to protect them from and avoid risky situations.

Interpersonal communication is essential for human relationship, as it permits and encourages the development of a relationship between communicators. For appreciating interpersonal communication properly, it is very important to underline its basic principles. Interpersonal communication is inescapable. We cannot afford not to communicate. The very attempt is not to communicate something. It is irreversible. One cannot really take back once it has been communicated either through words or tone of voice or gestures. It is complicated, primarily because of the number of variables (self, others, issues and their various dimensions) involved in the process. Interpersonal communication is also contextual. It has psychological/ relational/ situational/ environment/ cultural context.

Students need interpersonal communication skills to maintain both their independence and relationships. However, they can sustain their independence
and simultaneously maintain relationships, if they appreciate the points of view of others and communicate with self to decide about the position they would take on issues while communicating with others. In order to build and maintain positive relationships, they have to take responsibility for their actions and make informed and rational decisions.

In order to develop the interpersonal communication skills, the learners have to be engaged in experiential learning activities focused on the following abilities:

(i) Building a rapport with other communicators: Creating an ambience of confidence and conveying that conversation partners are important for you;

(ii) Listening more carefully and responsively: Acknowledging feelings and wants that others express, even if you do not agree;

(iii) Expressing yourself more clearly and more completely: Giving listeners the information they need for understanding your experience;

(iv) Asking questions more open-ended and more creatively: Putting questions for eliciting information and not for testing knowledge of conversation partners;

(v) Thanking for conversation: Expressing gratitude and appreciation.

Negotiation Skills:

The initiatives that will make efforts to develop various kinds of skills among them will contribute to enhancing their coping resources to negotiate.
To negotiate means to deal or bargain with another person or group to confer for mutual agreement, to manage or to cope with certain situation successfully. It is true that without even realising it, negotiation is something we do all the time not only for business purpose but also in our social lives to solve our problems or resolve conflicts. One also negotiates with set/quite often.

These skills may help them in maintaining a healthy and happy life and, importantly overcoming the peer pressure. They have to develop skills for understanding the point of view of others, being firm on one's values and beliefs and being assertive rather than aggressive. They have to negotiate not only with others but also within order to cope with emotions and stress, withstand peer pressure and say 'no' to harmful behaviour.

Negotiation skills may be developed and sharpened through experience and practice. Educational interventions for negotiation skills development have to involve the learners in activities that focus on the following abilities:

- Being hard on the issue and soft on the person(s): Taking firm position on the issues without spoiling the relationships with other person or other members of the group;
- Focusing on needs and not positions: Emphasing on the points needed to convey your point of view on the issues without considering whether the position you are taking is being liked or not;
- Responding and not reacting: Being assertive with other) person or other members of the group with patience without being aggressive;
• Emphasizing common ground: Insisting on whatever common ground has been covered and not disputing the negotiation in between;

• Being inventive about options and re-focusing on the issue: Trying to put forth innovative points in favour of the position you have taken;

• Making clear agreements: Reaching a consensus in clear terms.

SKILLS FOR TEACHERS:

Skill development among students has been an important objective of school curriculum since long, but very little has been done to realize this objective. That the teacher themselves need to develop skills to realise this objective among students is attention of the teacher curricular area like skill preparation process. This is more so for a yet to receive adequate education that is focused on the concerns, a substantial number of which are culturally very sensitive. Since the conventional teaching methods may not be effective in this context, the teachers need to develop certain specific skills to be able to contribute to the process of Life Skills development among students. In order to ensure effective curriculum transaction for skill development in teaching process, the teacher has to be equipped with the following three core skills:

(i) Communication Skills

(ii) Skills for being non-judgemental

(iii) Skills for empathy
Communication Skills

Communication is used in a number of ways - to inform, educate, persuade, motivate, help, reinforce or advocate. It is the ability as well as a process to express and convey information, ideas and experiences, both verbally and non-verbally. There are many channels of communication that aim at achieving these objectives and every channel employs specific set of skills to make communication effective. Teachers need interpersonal communication skills to help adolescent students develop skills related to adolescence reproductive and sexual health. Interpersonal communication is a “person-to-person, two way, verbal and nonverbal communication between two or more people”. As such, it can be one-to-one or group communication. It may be very effective in communicating technical or non-technical information and also the emotional or sensitive component, so important in interpersonal interaction.

The communication skills for teachers have certain important sub-skills, such as rapport building, listening, attending, speaking, questioning. These skills are commonly used by every individual, but quite often not in an effective way. For example, listening is what people do all the time, but that is what they do not do. Although their ears are open to what a person is speaking, will say when it is their turn to they are thinking about what they speak; or they are remembering something they have to do after attending that session; or they are thinking of other issues. In fact, they are hearing but they are not paying attention to it. Particularly, when teachers are to interact with students on any
issues, it is necessary to understand the following sub-skills that make communication effective:

(a) **Rapport building:** Teachers are expected to equip themselves with: skills that facilitate the establishment of a spontaneous relationship between them and students based on respect and mutual trust. These skills help in creating a congenial environment free from apprehensions and inhibition.

(b) **Active listening:** The teacher has to develop listening skills consciously. For active listening, it is necessary to listen to the speaker(s) what he/she says and also how he/she says it. The speaker is not to be interrupted or cut in to describe teacher's own experience. The teacher is expected to avoid distracting movements and not to pay attention to outside disruptions.

(c) **Attending:** students need focused attention of the teacher while interacting with them. The teacher is expected to make students feel comfortable and respond to them with interest. He/she needs to win the confidence of students through attentive listening. Students are not to be criticized or put down. The teacher has to encourage students to speak.

(d) **Speaking:** While speaking the teacher has to maintain his/her voice at an appropriate pitch, neither loud nor too soft. The teacher should not dominate the conversation and express what he/she feels, not only what he/she thinks.
(e) **Questioning:** When students are speaking the teacher has to ask questions. But questions should be asked to show interest in what speaker is saying, to encourage the speaker and not to find out his/her ignorance or to embarrass him/her.

**VARIOUS LIFE SKILLS**

Life skills are abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenge of everyday life. The following are the ten generic skills. They are five pairs of related skills.

**Critical Thinking:** It is the ability to analyze information and experiences in an objective manner.

**Creative Thinking:** It is an ability that helps us look beyond our direct experience and address issues in a perspective which is different from the obvious or the norm. It adds novelty and flexibility to the situation of our daily life. It contributes to problem solving and decision making by enabling us to explore available alternatives and various consequences of our actions or non-action.

**Decision Making:** The process of making assessment of an issue by considering all possible/available options and the effects different decisions might have on them.

**Problem Solving:** Having made decisions about each of the options, choosing the one which the best suited, following it through; in the face of impediment,
going through the process again till a positive outcome of the problem is achieved.

**Interpersonal Relationship:** It is a skill that helps us to understand our relations with others and relate in a positive/reciprocal manner with them. It helps us to maintain relationship with friends and family members and also be able to end relationships constructively.

**Effective Communication:** It is an ability to express ourselves both verbally and non-verbally in an appropriate manner. This means being able to express desires, opinions, fears and seek assistance and advice in times of need.

**Coping With Emotions:** It is an ability which involves recognizing emotions in others and also in ourselves. Being aware of how emotions influence behavior and being able to respond to emotions appropriately.

**Coping With Stress:** It is an ability to recognize the source of stress in our lives, its effect on us and acting in ways that help to control our levels of stress. This may involve taking action to reduce some stress for example changes in physical environment, life skills, learning to relax etc.

**Self-Awareness:** It includes our recognition of ourselves, our character, strengths and weakness, desires and dislikes. It is a pre-requisite for effective communication, interpersonal relationship and developing empathy.

**Empathy:** It is an ability to imagine what life is like for another person even in a situation that we may not be familiar with. It helps us to understand and accept others and their behavior that may be very different from ourselves.
It is evident that the Life Skills are comprehensive including various areas like Thinking, Behavior and Emotions; the final target being self-awareness, esteem and accepting of others.

Major considerations of life skills:

- Life Skills are abilities, which are needed to deal with situations effectively.
- Life Skills determine the Psychosocial Competence and Self-Esteem.
- Life Skills are universal.
- Life Skills are learnt in an interactive manner during childhood and adolescence.
- Life Skills are the building blocks of development.

Life Skills develop on a continuous basis throughout one’s life and they are also used throughout one’s life. However, as in growth, the maximum and critical development of Life Skills occurs during childhood and adolescence. During adulthood minor changes and strengthening of one’s repertoire of Life Skills take place.

There is a difference in the development of Life Skills in Childhood and in Adolescence. As a child Life Skills are often modeled after parents and other adults. The child is more passive in learning the skills. The situations in which the skills have to be exercised are comparatively less and restricted to family and school situations.
During adolescence, Life Skills Development is a more active process. The adolescents have the intellectual maturity to assess a situation, assess the various aspects of a situation, challenge the prescription of others, delve into the repertoire of their skills, make a choice of their own and later come to a conclusion about the skill and its execution. Inspite of superior intellectual abilities, the adolescents’ behavior is more often colored by emotions than rationality. There is an emotional heightening that the youth has to contend with, but more often than not aware of it. Frequently the adolescent is in an emotional fix of wanting to be guided by the parents, yet free from them, more aligned to the peers. The adolescent also has the need to exercise skills to indicate and establish individuality and independence

**Role of Life Skills in real life situations**

From the conceptual analysis on LSE it can be inferred that life skills plays a major role in solving day to day problem in real life situation, to quote an incident for validation, an attempt has been made here,

"Vinod is a 14 year old 8th standard student. He is average in studies. He avoids classes frequently because of the fear of punishment by his class teacher. Lately Vinod does not complete his homework assignments. When asked about it he remains silent. Teacher gets angry and shouts at him and this has been occurring frequently. Actually, Vinod has difficulty in Mathematics and English. This is one of the reasons for not completing homework. Further, he
does not get any help from his parents. Added to this, atmosphere at home is very disturbed because of his father's drinking problem. As a consequence of all this he has been avoiding attending classes. (NCERT-2004)

From this example following issues can be identified

PROBLEMS:

• Difficulty in Mathematics and English
• Disturbed home atmosphere
• Lack of help from parents in studies
• Sensitive to criticism by the teacher

ACTION: Avoiding classes

It is important to mention that Vinod is responding to his current life situation by avoiding Mathematics and English teacher by avoiding classes. This is one way of handling this problem. But it is a fact that there are other alternatives and options such as,

• Talking to his teacher about the problem in Mathematics and English
• Sharing with teacher about his life situation
• Asking for help from other students
• Group study with a helpful classmate/classmates
EVALUATION OF THE LIFE SKILLS PROGRAM

Life Skills Education is a primitive program and the benefits are not evident in a short-term period. Normal adaptation and good coping are often assumed the norm in all individuals, which unfortunately, is not so. Evaluation of the program hence is difficult.

Certain methods are used to evaluate the program.

1. Process evaluation of the program
   - observing the increasing/decreasing level of discussion on the issues among students.
   - quality of the discussion over time
   - change in the attitude of the adolescents to other's views.

2. Certain common behaviors of the adolescent in the school which does not mean deviance but have the scope of positive and not so positive components.
   Some indicators are given below. The teacher who is the LSE facilitator can record them on a monthly basis

3. Record of Psychological Problems among the students
   - Emotional and Conduct Problems
   - Suicidal Attempts - both impulsive and emotional problems.

The following classroom level indicators can be considered as per the review of the studies conducted in this area are;

1. Drop-out from school – Number of students who have not attended for 3 months continuously
2. Absenteeism from class – Number students who have taken leave > 50% of the previous month

3. Disturbing classroom behaviour – Number time’s class had to be stopped due to the unruly behavior of the students in the class.

4. Not doing homework – Number Students who did not complete homework on an average

5. Academic performance – Relative changes in the performance of the student

6. Interpersonal relations with other classmates

7. Bullying other school mates

8. Incidents of Stealing, Lying

9. Shyness - Confidence

10. Interest in extra-curricular activities

11. Sharing of personal problems with teacher

12. Tobacco use,

13. Boy-girl relationship problems

14. Evidence of emotional problems

15. Willingness to take responsibility

16. Family's involvement in the student's school aspects

Education aims at preparing a child for adult life. It must develop such abilities and capacities that can make a child competent enough to deal with various challenges of life. In recent times there is an increased demand for life
skill based education because traditional mechanisms for passing on these skills may no longer be adequate.

A Paradigm shift has been witnessed in the roles played by the schools in equipping themselves to face the futuristic challenges in the global school educational perspective. Now schools are expected to impart skills that are needed for the socialization of young people and to prepare them for productive and prosperous life.

Life skills Education differs from conventional approaches to teaching health and other social interventions in school. It is a student centered participatory process of learning and applying new skills in supportive classroom environment.

WHO (1997) reiterated the significance of Life Skills as a way of one’s life and concisely explained it as “Life Skills are a group of psycho social competencies and interpersonal skills that help people to make informed decision, solve problem, think creatively and critically, communicate effectively, build healthy relationships, empathetic with others and cope with and manage their lives in health and productive manner. These are the abilities that help in the promotion of mental and social well being and competence in young children to face hard realities of life”.

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UNESCO (2001) gave the concept of Life Skills as Person's ability to maintain a state of mental well being and to demonstrate the same in adaptive and positive behavior while interacting with others in his/her environment.

It also recognized that the development of life skills should be the primary concern of education because there is a gap between content of education and the living experience of the students. The present day educational system lays a great deal of emphasis on the intellectual development of learners through teaching different subjects and preparing them for the world of work.

The development of Life skills among learners to overcome pressure of life and challenges in different situations is missing in the prevailing educational system. As a consequence the learner is not able to cope with the challenges arising from different situations of various places. These situations create in the learner anxiety, tension, frustration, depression etc. . . .

International Education Commission (1996) formulated global goals of education in order to fit a child into the mould of complete person through giving him/her better training of life skills. It is well established fact that education ultimately aims at formation of a complete man which is not possible without exposing students to various life skills.
The challenges which the students face today are failure in examination, attainment of marks lower than expected, cut throat competition, economic hardship etc... Persons who are high achievers are quite optimistic and enthusiastic to learn more on the learner’s side.

Each student has different problems of his /her own and needs of different skills to cope up with them. Life skills are neither a domain nor a subject. It cuts across application of knowledge, values, attitudes and skills which are important in the process of individual development and life long learning.

Life Skills are not just a set of skills nor are they equal to survival skills, livelihood skills or vocational skills.

The term Life skills refers to large group of psycho social and interpersonal Skills which can help people make informed decisions communicate effectively, and develop coping and self management skills, that may help them lead healthy and productive life. Life Skills will direct toward personal actions and action towards others, as well as actions to change the surrounding environment to make a conducive health.

**Life Skill based Education:**

A combination of learning experience that aim to develop not only knowledge and attitudes, but also skills is needed to make decisions and take
positive actions to change behaviors and environment, and to promote health and safety and prevent from risks.

Life Skills are ‘living skills’, or abilities for adaptive and positive behavior that enable individuals to deal effectively with demands and challenges of every day life. (WHO 1997).

According to UNICEF:

“a behavior change or behavior development approach designed to address a balance of three areas: Knowledge, attitude and Skill.”

Life Skills are essentially those abilities that help promote mental well being and competence in young people as they face the realities of life.

UNICEF identifies the following criteria,

- It should not only address knowledge and attitude change, but more importing behavior change.
- Traditional “information based” approaches are generally not sufficient to yield changes in attitudes and behavior. So that the exercises and situations which a particular feels the effect of experience makes him/her feel the situations.
- It provides the opportunities to repeat, recap, reinforce and review i.e. opportunities for learning to become more consistent.
**Indonesian authority and organization** defined, “Life Skills training as income based training, rather than specific training that provides children with skills in basic decision making and problem solving and developing the confidence, knowledge or skills to make decisions that will shape their lives”.

From the reviews of different source books of life skills education; researcher recognize the following do’s and dont’s while conducting the life skill activity and there are few key notes which were followed by researcher while conducting the programme. Life Skills Education involves experiential learning and application of this experience to a life situation. Hence the teacher should accept the entire situation chosen by the pupils without any bias or prejudice and encourage them to examine such situations closely. It is of paramount importance for the teacher to assume a neutral position and facilitate learning in the pupils by using techniques like role plays, brainstorming etc.

**DO's**

1. Encourage all children to apply life skills to various situations - small or big problems.

2. Encourage them to think and examine alternatives.

3. Respect their choice and opinions.

4. Be open and democratic.
**DON'T's**

1. Do not offer ready-made solutions or alternative or choices.
2. Do not reject or curb innovations in children however impractical it may be.
3. Do not enforce personal values or preferences from your experience.
4. Do not interrupt or cut short discussions.

**Skills for students**

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- Asking questions more open-endedly and more creatively;
- Thanking for conversation.

**Negotiation skills**

- Being hard on the issue and soft on the person(s);
- Focusing on needs and not positions;
- Responding and not reacting;
- Emphasizing common ground;
- Being inventive about options and re-focusing on the issue;
- Making clear agreements

**Skills for teachers**

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**Non-judgemental:**

**Dos:**

- Be convinced about the need for skill building among adolescents
- Avoid conveying personal values while discussing value laden topics
- Respect the diversity of background of the learners, their values and beliefs
**Don’ts:**

- Do not be prescriptive, as preaching proves to be counter productive
- Do no judge the person
- Do not treat learners as problems but as individuals who need compassion and care

**Empathic**

- Understand how the other person feels in a situation and what his/her point of view is.

**STRATEGIES AND METHODS**

The life skills approach comprised as its integral part makes it a still more uncommon area. Still it requires certain special efforts to introduce the transaction strategies for life skills development into the existing education system. The strategies for the institutionalization of LSE the education system and methods of curriculum transaction, therefore, needed to be carefully identified primarily because of the following characteristics of this area:

1. Life Skills development has emerged as a curricular area in response to the pressing demands emanating from outside the education system, it is considered to be imposed and hence is often not put through the general curriculum planning and review process. It is often given a marginal role within the curriculum.

2. It deals with contents that are very sensitive in nature and there is an in-built resistance to these elements.

3. This educational area focuses on problems confronted by adolescents
who have been traditionally treated as a homogeneous group which they are not. The variations in their age-range and their socio-cultural settings indicate their heterogeneous nature.

4. Developing life skills among the learners, this needs transactional strategies that create experiential learning situations and are basically interactive.

5. Although there is an increasing realization of the urgency for LSE and developing coping skills among adolescents, the age-old inhibitions and perceptible apprehensions in the adult world would require persistent efforts aimed at creating enabling environment for this educational intervention in schools.

Moreover, orienting school curriculum towards responding to the need for life skill development has basic problem that derives from the difficulties of trying to introduce a curricular area into a existing system which is not so conducive to the needed approach. It will require a clearly different pedagogy that frames the development of life skills as an educational process.

**Strategies**

In view of the above, the following strategies may be adopted to facilitate the institutionalization of this curricular area in the content and process of school education and teacher education:
Awareness Building:

The first and foremost need is to create a favourable environment for acceptance of the urgent need to impart LSE in schools. It has been experienced over a period of time that in most cases, because of the lack of proper appreciation of the needs of learners in the changing context and also of this educational area. This requires organization of awareness building activities for having interaction with policy framers, opinion leaders, media persons, curriculum developers, teacher educators, teachers and parents. Suitable strategies such as increasing use of mass media, particularly electronic media and interactions with concerned target groups including media persons may be very useful.

Integration in the School Curriculum:

LSE can be effectively transacted only when its elements are integrated the school curriculum with a view to facilitating effective integration in the content and process of school education. The nature of the existing school curriculum will also be a key determinant.

Co-curricular Activities:

However, the integration of elements of life skill education in syllabi and textbooks may have to wait till they are revised in due course of time. But in view of its urgency, the imparting of life skill education should not be postponed until its elements are integrated in syllabi and textbooks. The
teaching learning process may be initiated forthwith by adopting the co-curricular approach. Co-curricular activities, especially designed for adolescence education, may be organized in schools as early as possible. Students' activities like Question-Box, Group Discussion, Value clarification, Role Play, Case Study, Painting/poster Competition, Essay Competition and Quiz Contest may prove very effective in not only providing accurate and adequate information to students but also inculcating in them positive attitude and more importantly developing the needed life skills.

**Teaching methods:**

The traditional teaching methods may not be effective for this curricular area. It requires truly interactive, participatory and responsive, raising questions rather than providing ready-made answers. In fact, the pedagogy for the transaction of this area is yet to be institutionalized, though the following non-conventional methods are being adopted wherever transaction of this curricular area is being attempted at:

a) Inquiry or discovery method

b) Value clarification

c) Other interactive/participatory methods

d) Co-curricular Activities

e) Counseling (Teacher Counseling) and Peer education

f) Use of audio-visual/print materials
Pedagogical Methods for Skill Development

Suitable pedagogical methods are key to the development of life skills among the learners. Educational intervention directed towards developing life skills in respect of adolescent reproductive and sexual health is to be focused on enabling the learners for applying appropriate skills in the specific context, say, peer pressure or unexpected behaviour of some known person or coping with emotion and stress. It is, therefore, necessary to employ a methodology or pedagogy that frames the development of life skills as in educational process. It is often assumed that teachers will transact a radically different curriculum in life skills development when they are exposed to a minimal package of in-service training, often delivered through cascade approach. But expecting teachers to adapt to a different type of educational intervention without providing them a well designed intervention plan is often unrealistic.

It is felt that the conventional pedagogical methods may not be effective for life skills development among the learners. Only those methods are expected to be effective that are primarily interactive and participatory and are focused simultaneously on providing knowledge and developing positive attitudes and interpersonal skills. It is very important to lay special emphasis on experiential learning. Learners are to be engaged in a dynamic teaching learning process, so that the learning leads to an active acquisition, processing and structuring of experiences. In a passive learning the teacher passes on knowledge mostly through a didactic teaching method and the learner is the
recipient of information. But education for life skills development requires the teaching learning process to be both active and experiential. The pedagogical methods focused on group work and discussion, role playing, foretelling, debating and the like may be effective.

THE CONCEPT OF PROBLEM SOLVING:

We live today in a world of ever increasing complexities. More and more we find ourselves faced with problems which need to be solved quickly and effectively. Success in modern world depends on just such ability. It is therefore imperative that we develop our problem solving ability to such an extent that solutions come naturally to us, intuitively rather than after a great deal of deliberation and analytic thinking.

Problem solving as techniques still remains confined to the pages of a book on education. There are hardly any examples in actual teaching and learning situations where teachers have practiced the techniques involving the students thereby challenging their problem solving abilities.

Mathematics as a discipline has been enriched by way of the problems posed by thinkers to their competencies. Problem Solving is being considered as an important innovation in teaching in modern times. In one of the main recommendations of the International Conference on Mathematics Education at Berkeley, California in 1980, Problem Solving (PS) was selected as number
one focal point for the united state major educational programme. Even some people recommended that the 80’s to be observed as the decade of Problem Solving.

Problem solving does not mean just solving a problem. It requires long time and patience. A Mathematical problem is a situation presented before a student who cannot answer it in a routine manner. It means that the student does not have an immediate response pattern in his mind to undertake the solution procedure.

Thorndike has mentioned a very important characteristic of a problematic situation. According to him the individual has no habitual responses pattern available for solving a situation. It follows that what may be problem for one may not be problem for another. Also a problem for a student yesterday may not be the problem for him today. It clearly indicates that problem solved by a student does not remain a problem for him in future.

Brown defined “a problem should involve some sense of blockage, doubt or frustration”

According to Davis (1973) “A problem is a stimulus for which an organism does not have a ready response”
John Dewey's comment "two limits of every thought are perplexed, troubled or confused situation at the beginning and cleared up unified situation at the close."

All genuine learning situations in mathematics involve problem, many people perceived "word problem" as the only type or "problem". The main characteristic of the problem is that they provide a new or unfamiliar situation but they are challenges and have been derived from life situations. A problem is a situation, quantitative or otherwise that confronts an individual or group, that requires resolution and for which the individual has no apparent or obvious means or path to obtaining the solution. Problems will no longer be a problem once it can easily be solved by algorithms that have been previously learned. What a problem for someone may not be a problem for another who has more experience in the concerned field.

It means that the problems should neither be so difficult that a student is not able to solve any of them successfully, nor should they be so easy that they do not pose any challenges before the student. The time for solving the problem may not be too long. Otherwise the student is likely to lose interest in solving the problem.

Characteristics of good problems are (Stephen Krulik and Jesse A. Rudnick (1980)
1) The solution to the problem involves a distinct mathematical concept or skill.
2) The problem can be generalized or extended to a variety of situations.
3) The problems lend itself to a variety of solutions.

Problem solving is a process. It is the means by which an individual uses previously acquired knowledge, skills and understanding to satisfy the demands of an unfamiliar situation. The student must synthesize what he or she has learned, and applies it to the new and different situation. (62)

There is a close relation between the classroom teaching of mathematics and the quantitative situations in life, so an emphasis on problem solving in the classroom can lessen the gap between the real world and the classroom world, and thus create a positive mood in the classroom. Problems show the interconnections among many ideas. Problems are never solved in vacuum, but are related with something to seen before, to something learned earlier. Thus good problems can be used to review past mathematical ideas, as well as to sow seeds for ideas to be presented in the future time.

Problem solving is more exciting, more challenging and more interesting to children than barren exercises. It makes the children involve in the process of learning by which it leads to get the better end product. Thus, the carefully selected sequence of problem solving activities that yield success
stimulates students, leading them to a more positive attitude towards mathematics in general and mathematics in particular. It allows the learner to use information and facts in an essential situation to solve the problems even in other unfamiliar situations in both the classrooms and in life situations.

**Stages of problem solving:**

There are several stages in Problem solving; researchers have given their own models in different forms.

It starts from Wallis (1926) who about 83 years ago described four stages of problem solving namely:

1) Preparation,
2) incubation,
3) illumination and
4) Verification.

Holfman and co-workers (1951) analyzing the objectives of problem solving gave the following steps:

1) Sensing the problem
2) Defining the problem situation
3) Studying the situation for all facts and clues bearing upon the problem
4) Testing hypotheses by experimenting or by other means.
5) Accepting tentatively or rejecting the hypotheses or testing other hypotheses.
6) Drawing conclusions using hypotheses for generalization in terms of similar problem situation

**George Polya** (1957) suggests the four stages of problem solving;

1) Understanding the problem
2) Devising the problem
3) Carrying out a plan and
4) Looking back.

**Jain** (1996) has given some analysis strategy;

1) Understanding the nature of the problem
2) Comprehending the ideas contained in the problem
3) Using Mathematical Skills
4) Ability to solve the problem
   a) Analyse the problem into sub problems which are manageable
   b) Simplify/recognize the conditions of the problem
   c) Make plausible assumptions
   d) Represent situations diagrammatically
   e) Attempt the solutions to problem in a systematic way.
5) Developing general abilities.

**Bossing** has discussed essentials of problem solving,

1) Ability to sense the problem and emergence of problem.
2) Defining the problem.
3) Collecting the relevant data.
4) Interpretation of the data.
5) Consideration of evidence leading to formation of conclusion.
6) Testing conclusions or verification of solution.

According to John Dewey the five steps of problem solving design given by him are:

1) A felt difficulty.
2) Its location and definition
3) Suggestion of possible solution
4) Development of reasoning of the bearing of suggestion
5) Further observation and experiment leading to its acceptance or rejection.

It has been pointed out by psychologists that it is not necessary that the mind should follow the orderly sequence given. A person may get an intuitive understanding of the problem and may start with hypothesis. He may proceed to verify it. Thus, the stages may be skipped or greatly considered.

**Characteristics exhibited by good problem solver:**

- Good problem solver has a desire to solve problems.
- Problem solvers are extremely perseverant while solving problems. They are not easily discouraged when incorrect, or when a particular
approaches leads to a dead end. They go back and try the approach again and again.

- A variety of methods of attack are usually at their disposal. If one method of attacking the problem fails to yield a satisfactory solution, successful problem solvers try another.

- They show an ability to skip some of the steps in the solution process. They make connections quickly, notice irrelevant detail, and often require only a few examples in order to get generalizations. They often show a marked lack of concern about neatness while developing their solution process.

- They are not afraid of guessing. They will make ‘educated guesses’ and attempt to verify these guesses.

- They hold conversations with themselves. They know what questions to ask themselves, and what to do with the answers they receive as they think the problem.

The problem solving skills given are train the learners mind in problem solving from the very beginning to creative problem solving. These skills stimulate imagination, when the problems at lower level are dealt. Human brain employs right and left cerebral hemisphere in thinking and problem solving of the two cerebral cortices the right one processes information in divergent modes. The left one utilizes convergent thinking patterns (Guilford 1977) scientific problem solving employs both the hemispheres of the brain.
According to Pachaury (1990) critical and creative process are involved in scientific problem solving. The major concerns of the problem solver in this kind of activity are to create mental models of discrepant events for solving a given problem (Johnson-Laird and Bryne 1991; John Laird et al 1992).

Problem solving can also be done by divergent thinking which is designated as free thinking. Divergent problem solving is highly flexible and the solution of such a problem has high originality. Whatever be the modes of problem solving by divergent procedures, it involves some kind of transformations (Guilford 1950). Problem solving by divergent modes of thinking essentially generates a new representation for existing realities.

Hafner and Stewert (1995) defined

“Problem Solving is a complex, multi layered skill”

The process of problem solving depends on

i. fluidity of thinking (Guilford 1986)

ii. generation of mental elements (Johnson-Laird 1993)

iii. Continuous search of new ideas.

Duncker (1945) noted that,

“When one cannot go from the given situation to the desired situation simply by action, then there has to be recovery of thinking.”
Polya (1981) defined problem solving as,

"Finding a way out of a difficulty, a way around an obstacle, attaining an aim that was not immediately attainable"

Newell and Simon (1972) defined

"Problem solving as a search for a path between the given and goal states of a problem".

Mayor (1992) has summarized three major aspects of a definition of problem solving:

a) Problem solving is cognitive because it occurs internally within the problem solver's cognitive system.

b) Problem solving is a process, because it involves manipulating or performing operations on the problem solver’s knowledge.

c) Problem solving is directed because the problem solvers are attempting to achieve some goal.

Gardener (1985) defines

"Problem solving involves a series of mental computations, so a theory of problem solving must specify the specific mental process used to solve a problem as well as the methods that problem solver employs for selecting and controlling their cognitive process."
John P. DeCECCO (1970) defines

"Problem solving as a form of principle learning in which lower order principles are applied in the learning of higher order principles".

Barting’s (1981) study the pupil’s difficulties in problem solving lists the following causes of inability to solve problems.

- Lack of ability to perform accurate reading and the fundamental operations.
- Failure to comprehend the problem as a whole or in apart.
- Lack of knowledge of facts essential to the solution of a problem.
- Lack of sufficient interest in the problem to inspire the required mental efforts.
- Lack of ability to identify proper processes with the situations indicated in the problem.
- Failure to form the habit of verifying the result.
- The habit of being guided by some verbal sign instead of making an analysis of the problem.
- Lack of ability or care to properly arrange the written work in orderly, logical form.
- Habit of focusing the attention upon the numbers and being guided by them instead of by the conditions of the problem.
- The pupil may fail because the problem requires exertion beyond the span of attention.
• The failure to recognize the mathematical similarity to type problems which
  the pupils understand, because of some unusual situation in the problem in
  question.
• The pupil may fail because of absolute inability to do reflective thinking.
• Lack of ability to understand the problem.

Thought process involved in problem solving:

Recent analysis of cognition as information processing throws new light
on problem solving as cognitive activity. These analysis attempt to account for
the human minds ability, with a limited capacity for processing information, to
solve complex problems that require planning and strategy. Studies of expert
problem solvers and computer simulations of problem solving processes shows
that the solution of a complex problem requires;

1. A rich store of organized knowledge about the content domain
2. A set of procedures for representing and transforming the problem and
3. A control system to guide the selection of knowledge and procedures.

Successful problem solving requires an active stance; the pupil should
attempt to transform an intractable problem, simplifying it or representing it in
some other way, rather than waiting passively for an inspiration.

The problem solving method was considered were effective teaching
strategy to develop mathematical creativity. Indian Mathematicians like

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Ramanujan, Bhaskaracharya, Aryabhata, Brahmagupta etc. among the most prominent figures who solved difficult problems of mathematics through problem solving approach.

Teaching of Mathematics:

Mathematics is a very important subject in our school curriculum. In 21st century our society is moving into a technological era where mere memorization of mathematical facts and principles is not sufficient. The role of mathematically creative persons for the continued growth of the world is indispensable.

Mathematics is one of the oldest organized disciplines of human knowledge, with a continuous line of development spanning 500 years and every major culture. It is collective curiosity of man since time immemorial and it attempts to provide a Joy of knowledge through procedures that are objective.

The advent of automation and cybernetics in this century have marked the beginning of new scientific, industrial revolution and makes all the mere imperative specific attempt to the study of mathematics.
Mathematics is essential for the existence and progress of modern world, the knowledge of methods and application of knowledge of mathematics has become an integral part of every new innovations.

National Policy on Education (1986) has envisaged that “Mathematics should be visualized as the vehicle of communication to train a child to think, to reason, to articulate and to analyse logically. It should be treated as a concomitant to any subject involving analysis and synthesis”.

Mathematics knowledge is the necessary for today’s systematic life. Without numerical and mathematical evidence one cannot decide many issues in our day to day life. It is the study of abstractions and their relationships in which the only technique of reasoning that may be used to confirm any relationship between one abstraction and another is deductive reasoning.

The Kothari Commission (1964-66) rightly points out that study of mathematics plays a prominent part in modern education. It says” one of the outstanding characteristics of scientific culture is qualification”. Therefore the mathematics assumes the prominent position in modern education.

Mathematics education in schools is more emphasized as it improves concept development, fosters higher cognitive abilities and skills. Mathematics is a very useful subject for most vocations and higher specialized courses of
learning. Many a time’s mathematics is also presented from a wrong point of view. It is presented as a matter of learning dead facts and techniques and not in terms of its true nature, which involves processes that demand thought and creativity.

Jain D.K. (1979) studied the significant correlates of high school failures in mathematics and found that students lacked motivation for abstract reasoning. Most times, lack of knowledge of basic concepts and principles caused difficulties in problem solving.

**Philosophy of teaching Mathematics:**

A philosophy of education becomes significant at the point where educators recognize the need to think clearly about what they are doing and to see what they are doing in the larger context of individual and social development.

**Idealism in Teaching Mathematics:**

Idealism is one of the oldest philosophies available which may assist the mathematics teacher to select objectives, learning opportunities, and evaluation procedures for pupils. Plato (427-347 BC) advocated idealism as a philosophy of education, a study of mathematics which assists the learner to attain well mentally. Idealism as a philosophy of education still receives much attention today. A mathematics teacher who is an idealist tends to emphasize mental
endeavours as being superior to the physical and its emphasis. The mind is what is truly real about the person. Thus the mathematics teacher needs to stress pupils attaining abstract content in mathematics since this will aid mental development. Higher level cognitive level objectives need to be selected and implemented in the mathematical curriculum.

For the Idealist, mathematics presents content to pupils to encourage the development of reasoning power in which the mind achieves in the direction of the Infinite, the unlimited in terms of attaining an ideal Mind, not matter, represents ultimate reality. The mind and mathematics content stress reaching toward the ideal or infinite in achieving.

**Realism and Mathematics:**

The one who stresses realism as a philosophy of education believes in using the methods of science in teaching and learning situations. The subject matter in mathematics is really independent of the observer or person. Precision is a key word to use in teaching mathematics, according to the realist. A realist likes accurate description of what exists.

A mathematics teacher who is a realist in terms of philosophy of education derives precise objectives for learner attainment. He/she matches the learning opportunities with the stated specific objectives so that an increased number of objectives will be achieved.
Mathematics probably possesses the most objective subject matter as compared to the other academic disciplines. This makes the realism as a philosophy of education very useful in choosing precise objectives for pupil to achieve.

**Experimentalism and the Mathematics:**

The world of experience represents ultimate reality for the experimentalist. Life in society continually changes. Thus, problems arise, which needs identification. Each problem is life like and reality based not fictional. Clarity in problem selection is relevant. Vague, hazy problems do not lend themselves to solution. The everyday experiences of people in society pertaining to mathematics provide the content for learning. According to Ediger (1994-1995) "problem solving requires deliberation in finding the solution to the unknown. In the societal arena, there are problems in mathematics which need solving. These problems have personal meaning and purpose for the learner. Thus, the learner individually or within a committee identifies a problem. The identified problem must be specific enough, so that, it can be solved, but not so specific that rote learning is involved to recall answers.

**Existentialism and the Mathematics:**

Existentialists stress the individual choosing and making decisions. To be sure, it is very salient that each pupil learns to engage in the making of
choices. Life consists of making choices. Existentialism stresses the individual choices made by a pupil in selecting sequential tasks and experiences in mathematics. The pupils are the choosers. The tasks may involve problem solving as well as other kinds of tasks. The teacher needs to select that philosophy to implement which assists a pupil attain optimally.

**Psychology in teaching Mathematics:**

Many psychologists provided the different guidance tips in teaching mathematics.

**B.F. Skinner (1904-1988)** advocated the highly structured curriculum in which pupils would make a few errors when achieving objectives in the ascending order of difficulty. A psychology of behaviorism is emphasized; the responses are either correct or incorrect as given by the pupils individually.

For **Skinner (1969)** “teaching is an arrangement of contingencies of reinforcement which expedites learning”.

Skinner believes that promotion of learning is possible by giving attention to the following factors:

- The behavior that is to be learned
- The reinforces that may be used
- The scheduling of reinforces
In terms of Skinner's operant behaviorism: "a program can be seen as an arrangement of material that will lead students to emit correct responses and will also provide reinforcement for the responses."

The essential elements regarding of programmed instructions are:

- An ordered sequence of stimuli
- Specific student responses
- Immediate knowledge of results
- Small steps
- Minimum errors
- Gradual shaping of terminal behavior
- Self pacing

**James Popham and Behaviorism:**

James Popham believes in using measurement driven instruction with the objectives stated behaviourally. The stated objectives leave no leeway for interpretation. The mathematics teacher can provide learning opportunities which contain only that which is in the stated objective appraisal as done in terms of the stated objective to determine if learners individually have been successful achievers.

**Robert Gagne and task analysis of objectives:**

Robert Gagne (1984) is a leading psychologist in education who recommends a behaviourist approach in teaching; however his thinking is more
open ended as compared to Dr. Skinner and Popham. Gagne’s eight sequential steps of hierarchical learning for pupils are the following:

- Signal learning
- Stimulus response
- Chaining
- Verbal association learning
- Multiple discrimination
- Concept learning
- Rule learning
- Problem solving (as being the most complex form of achievement)

Gagne found task analysis as being a very appropriate way of determining sequence of pupils. Gagne’s principle or rule learning indicates that learners relate concepts so they become usable. The last hierarchy is problem solving. Thus principles or rules are needed to understand how to solve the problem. A strong point in Gagne’s hierarchy of objectives is that the teacher needs to go back a step or level if a pupil does not understand what is to be done.

**Jerome Bruner and the structure of Knowledge in Mathematics:**

Jerome Bruner, professor from Harvard University, advocated a structure of knowledge approach in teaching mathematics. The structural ideas may be used again and again by learners as they proceed to more complex
learning’s on sequential grade levels. Jerome Bruner stressed the use of three kinds of materials in teaching mathematics to pupils. They are, enactive, iconic and symbolic. This sequence in pupils learning then emphasizes the teacher using concrete, semi concrete and the abstract materials in teaching. He advocates the use of inductive methods of instruction in which pupils discover structural or major academic ideas of discipline.

**Jean Piaget and development psychology in Mathematics:**

Jean Piaget stressed the importance of pupils going through specific maturational level such as the sensorimotor, preoperational, concrete and abstract levels. So the teaching must be ordered in such a way where a learner feels comfort with their age.

**John Dewey and problem solving in Utilitarian situations:**

John Dewey advocated utilitarian mathematics curriculum in which school and society would be related. What is useful in society should provide the basis for the school curriculum. John Dewey did not consider textbook problems to be being life like and reality based. Predetermined questions raised by the teacher with reference to the leaned concepts. Problem solving emphasis the useful and the utilitarian in the pupils’ life in the school setting.

John Dewey believed that pupils liked to work on collectively rather than individually in solving problems. Learners too desired to find on their own
instead of being told how to locate an answer. Pupils were active, not passive recipients of knowledge. Creative behavior is preferred much more so as to compare to conformity endeavors.

The following are the salient points of John Dewey’s Problem solving approach:

1) Activity centered approaches are emphasized in teaching in that pupils are the focal point of the curriculum.
2) Mathematics stresses that pupil with teacher guidance select relevant life-like problems which need solving.
3) Learning by doing, not passivity on the part of pupils, is a must for learning to accrue in mathematics.
4) Purpose and interest on the learner’s part make for learners effort and perseverance in solving problems.
5) The role of the teacher is to encourage, help and assist pupils in attaining solutions to problems.

Methods of teaching Mathematics:

The method or methods used in any particular context are largely determined by the objectives that the relevant educational system is trying to achieve. Method is a style of the presentation of content in the classroom. The following are the Methods that can be used to make teaching and learning process of mathematics effective,
• **Conventional approach:** the gradual and systematic guiding through the hierarchy of mathematical notions, ideas and techniques.

• **Classical education:** the teaching of mathematics within the classical education syllabus of the middle ages, which was typically based on the Euclid's Elements taught as a paradigm of deductive reasoning.

• **Rote learning:** the teaching of mathematical results, definitions and concepts by repetition and memorization. Within the conventional approach, is used to teach multiplication tables.

• **Exercises:** the reinforcement of mathematical skill by completing a large number of exercises of similar type of problems.

• **Problem solving:** the cultivation of mathematical ingenuity, creativity and heuristic thinking by setting students open ended, unusual and sometimes unsolved problems. The problem can range from simple word problems to International Mathematics Olympiad.

• **New Math:** a method of teaching mathematics which focuses on abstract concepts such as set theory, functions and bases other than 10. According to Tom Leher "the new approach, the important thing is to understand what you are doing, rather than to get the right answer.

• **Standard based Mathematics:** a vision for pre college mathematics education in the US and Canada based on constructivist ideas and formalized by the National Council of Teachers of Mathematics which created the principles and standards.
• **Inducto-Deductive method**: it is a combination of inductive and deductive method. Inductive method is to move from specific examples to generalization and deductive method is to move from generalization to specific examples. Teacher many a times start with specific examples and concrete things and then move on to generalization and abstract things. Then again needs to show how generalization can be derived and how it holds true through specific examples.

• **Analytico-Synthetic method**: it is a combination of Analytic and synthetic method, Analytic is breaking down and moving from unknown to known and synthetic is putting together known bits of information and moving from known to unknown. These methods are basically used in proving the results and solving sums.

• **Play way method**: this method consists of the activities that include a sort of fun or play and give joy to the students. Students don’t realize that they are learning but in a way they are gaining knowledge through participating in different activities. This method helps to develop interest in mathematics, motivates students to learn more and reduces the abstract nature of the subject to some extent.

**Aims of teaching Mathematics.**

Education is imparted for achieving certain goals. Various subjects of the school curriculum are different means to achieve these goals. Each subject has some goals are attached, which are to be achieved through teaching of that
subject. According to Sidhu (1995) the goals of teaching mathematics are as below:

- To develop mathematical skills like speed, accuracy, neatness, brevity, estimation
- To develop logical thinking, reasoning power, analytical thinking, critical thing etc.
- To develop power of decision making
- To develop the technique of problem solving.
- To recognize the adequacy or inadequacy of given data in relation to any problem.
- To develop scientific attitude, that is to estimate, find, and verify results.
- To develop the ability to analyze, to draw inferences and to generalize from the collected data and evidences.
- To develop heuristic attitude and to discover solutions and proofs with one’s own independent efforts.
- To develop mathematical perspective and outlook for observing the realm of nature and society.
RESUME OF THE SUCCEEDING CHAPTERS

The report of the study is organized in five chapters

The Chapter-I, Introduction presents the Need, Objectives of the Study, Statement of the Problem and Scope of the Problem. The importance of Mathematics and Methodology are also briefly discussed along with the Life Skills. The conceptual background regarding Attitude towards Mathematics, Self Concept, Problem Solving Ability and there need and importance of the study and other related ideas were given briefly.

The Chapter-II consists of reviews related to Life Skills in Education and reviews related to the Attitude towards Mathematics, Problem Solving Ability and the Self Concept were discussed.

The Chapter-III presents the methodology used for the study that is the variables, tools employed, sample used, data collection, procedure of scoring and consolidation of data. It also includes the design of the study, hypotheses stated and also operational definitions of terms and concepts used in the study. It also signifies the statistical treatment used for analyzing the data gathered.

The Chapter-IV is mainly concerned with the statistical analysis and interpretation of data followed by a brief conclusion.

The Chapter-V deals with the major finding and conclusion of the study; Educational implications and suggestions for further research are reported in this chapter.