

Chapter I

Conceptual Framework

1.0 Introduction

Education, in other words, is continuity in development of knowledge and learning in a formal and informal setting such as school, home, a society where accumulated knowledge and values of humanity and civilization are transferred to the next generation. Education can develop individuals in terms of knowledge, creativity, skills, and nourishing personality & behaviour, and modernizing thoughts. In one of his speeches, Robert Kennedy (1966) has rightly said, "This progressive world demands young minds with dispositions like temperament of will and aptitude and not just a state of being, a speed in imaginative thoughts and dominance of courage over nervousness. In addition, youth should have love for explorations and experiences ahead of easy living". To develop such qualities among young generation, education especially better, improved as well as skill oriented, would be the most appropriate tool.

Education, specifically science education, enables the transformation of an individual with rejuvenated ideas, beliefs, skills, creativity, and understanding. Science is one of the essential aspects that revolutionized the knowledge field and made it accessible and reachable to every individual. Rapid transition is undergoing in the world because of this revolutionized & modernized lifestyle and easily accessible information. Due to these changes, noticeable shifts could be observed in today's value system, knowledge, health and other aspects of life. Under such circumstances, the development of the students at any level, through education alone, may not be sufficient for survival.

To meet the demands of today, education needs a metamorphosis to teach as well as improve a range of skills essential for prosperous and healthy living and endure the trials of a real-life situation. This re-oriented education will help and enable students to manifest their inner potential with confidence and competence to face life's challenges. Additionally, this reframed, and advanced education empowers students with abilities to evaluate the situation and consider smart choices based on their own ideas and abilities, rather than just merely coping others, and rather following crowd, they critically examine the situation. The informed and skilled individual is more likely to make better decisions concerning their careers, relationships, habits, and physical and mental health, thereby being socially adept, successful, and an asset to society.

As Niranjana & Mythili in 2012 stated, "in the present circumstances, youth, as well as children, are facing difficulties in life which leads to number of unidentified psychological and emotional distress". Proper nurturance and right guidance are critical determinants of adolescents' bright future, which ultimately contributes to the development of society and the country at large. Thus, education based on skill-based learning, empowers young generations to develop their inherent value with all their head, hand, and heart capacities to reap the rewards of educational experience. According to Rao (2003), "educating life skills was valuable and have positive influence on everyone especially younger ones, as it is an important aspect in overall personality development process of an individual". Life Skill Education acknowledges many issues unreasonably faced by today's adolescents, such as gender-based violence, discrimination, school drop-out, poverty, career issues, gender refusals, disturbed parenting, unstable housing, urge for gender acceptance, and related concerns. Berk (2007); Vranda & Rao (2006) pointed that students develop negative identities or suffer from role diffusion if they find unsettled and undetermined issues in their lives. Further, the research highlighted that these identity issues might lead students to remain directionless and improvise with many psychological challenges when they reach adulthood. Various studies suggest that training of life skills is very effective in reducing substance abuse such as cigarette smoking (Botvin et al., 1980), drug abuse and alcohol (Botvin et al., 1995, 2012), tobacco prevention (Zollinger et al., 2003 and Botvin et al., 2003). Numerous studies suggested that life skill education plays a significant role in enhancing self-confidence, self-esteem, reproductive health, gender issues (Khera & Khosla, 2012), developing behaviour (Nair, 2005), and playing an essential role in moulding students.

Life Skill education being much flexible, could easily be integrated into the formal education system. Even National Education policy 2016 has suggested introducing life skills in the formal education system. Undoubtedly, these skills could also enhance the effectiveness of teaching competencies while integrating with the core subject. Venkatesh (2009); Kumari (2002); Shin & McGee (2002); Gafoor & Shemi (2007); Christane (2008); Pany (2008); Thurman (2009); Zimmerman (2010); Malhan (2011); Bindu (2015) took the help of different teaching-learning strategies to develop life skills in students through core subjects. Since science is not purely a subject, it is an interaction with nature, communication with the physical and biological environment, observation, and experimentation of different fundamentals of life and has the necessary prerequisite skills to learn and understand it. Subsequently scientific skills also include some of the

life skills such as creativity, problem-solving skills, thinking skills, it would be a help in developing life skills through science and technology subjects.

1.1 Concept of Life Skills and Life Skill Education

1.1.1 Life Skill

A skill is an academic competency of an individual to bring about the desired result. In other words, skill is an acquired ability that can be learned through deliberate yet methodically organized and continuous efforts. As a result of these learnt skills, an individual will be more capable of performing any activity that involves thinking, doing and interacting with others. According to Winston English Dictionary (1957), skill is knowledge of any art together with expertise to put that knowledge to use. The term skill denotes that some learning has taken place and integration of behaviour has resulted. Considering, teaching as a best example of blend of knowledge and skills, a teacher needs to maintain a balance between the quantity and quality of the lecture. Profusion in knowledge comes with expertise over content, and quality in the study results from proficiency in teaching skills. Thus, in every part of life, skills play an essential role.

Everyone needs a broad range of skills to enhance adeptness in their work or life. Out of these wide ranges of skills, life skills are essential, as they directly or indirectly influence and help acquire other skills. As Hendricks (1998) reported, "Skills that help an individual successfully live productive and satisfying life are life skills". Dohmen (1996) described "life skill constituents are crucial in the application of conceptual knowledge focusing abstract thinking while reflecting in any concrete and real-time situations".

Life Skills are the competencies that help individuals create circumstances for self-happiness and self-satisfaction through the combination of different skills. For example, decision-making frequently requires critical thinking, problem-solving and self-analysis (what are my options?) and clarifying values (what is important to me?), which may help one comprehend and make better choices and take firm and appropriate decisions.

1.1.2 Definitions of Life Skill

While going through various reports, studies, articles, and other related documents, researchers come across several definitions of life skills. Most detailed explanations of life skills evinced that these must be recognized as the hidden potential that needs to be brushed up for healthy and progressive living. It includes self-progress as well as social progress by self-understanding and self-interpretation.

The World Health Organization (WHO, 1997), after extensive research in the field of life skills, explained life skills, "the skills and competencies of an individual showing adaptive, encouraging and developmental behaviour empowering individuals to manage and face the test and trials of daily life". Furthermore, WHO stated, "Adaptive means that a person is flexible in approach and can adjust in different circumstances. Whereas, 'Positive and developmental behaviour' explained as a person is forward-looking and, explore every possible opportunity to find solutions in any difficult situation". In particular, as concluded from multiple documents related to life skills, such skills comprise psycho-social competencies as well as emotional intelligence that enable an individual:

1. to think and behave critically and creatively,
2. solve problems by developing decision-making capabilities,
3. manage stress and emotions effectively,
4. communicate more efficiently,
5. shape healthy relationships
6. manage lives healthily and productively.

Life skills enable individuals to behave in more constructive ways and choose appropriate choices when placed in any situation having open scope and opportunities for favourable decisions.

United Nations International Children's Education Fund (UNICEF, 2004) defined life skills "as a strategy which mainly focus on the development of behavioural aspects and specially designed with an approach to balance three key aspects: knowledge, attitude, and skills". The framework of UNICEF's definition was based on research evidence that suggests that shifts in risk behaviour are unlikely if knowledge, attitudinal and skills-based competencies are not addressed".

In one of its documents, using the four Hs, World Health Organization (WHO, 1997) exemplified life skills as blend of qualities of heart, hands, head, and health. Further, WHO explains that heart centres on active involvement in caring, the hand is concerned with productivity, the head will need to be perceptive and handling things. Finally, health is vital to lead a fulfilling life. Maledon in 2008 explained Life skills as "an approach blended with knowledge, behaviour, attitudes, and values". He further pointed that "life skilled individuals were generally considered as better-informed and good decision-makers". He includes critical thinking, creativity, ability to organize, social and

communication skills, adaptability, problem-solving, and interpersonal relationship skills.

In essence, Life skills refers to an individual's ability to function and participate in daily lives effectively. The approach emphasizes the amalgamation of knowledge, attitudes, and skills into practical abilities. Rychaen & Salganik (2001) defined life skills on three general criteria, namely a) key competencies contributing to successful life and thus, to a well-functioning society, b) key contributor in meeting challenges of real life situations and c) is relevant to all individuals.

According to Roy (2006), "Life skill approach incorporates different values, skills attitude and knowledge predominantly underlining the blend of critical and creative thinking, self-management, problem-solving, communication, self-awareness and interpersonal relationship". He further added, "expertise in Life Skills and comprehending those skills in any situation will help an individual with the freedom to decide what to do, who he is, and what he wants to accomplish" (cited by Bhandari, 2011).

In other words, skills define a proper, healthy, and competitive living style while handling each situation confidently and coping with the stress of day-to-day struggle and emotions. Being active and taking the responsibility for being in a particular situation in a particular manner for successful living is what life skill means. Practising life skills means refining our self-esteem, sociability, and tolerance, making ourselves competent to take constructive decisions leading to effective change, and capabilities to understand and make safe choices such as what to do and who to be. With the help of life skills, one can explore alternatives, understand and differentiate pros and cons and reason while solving the issue as it arises. In the words of Meena (2010), life skills help the individual move with the right step to achieve the final level of self-actualization, self-esteem, and a sense of belongingness. Helping individuals to understand and comprehend life skills through a specific and need-based curriculum with defined objectives, is Life Skill education. A detailed overview is presented in the next part.

1.1.3 Life Skill Education

Having been introduced in the mid-1980s, life skill education has been successfully implemented in number of countries, thus demonstrating its effectiveness. In addition to promoting mental well-being in young people, life skill education helps prepare them for the challenges of adulthood. As stated by Nair (2005), " In addition to supporting mental well-being and fostering a positive behavioural outlook, life skills education encourages

healthy living in addition to helping individuals become better pro-social citizens". According to Srikala and Kishore (2005), "life skills education can be seen as empowering adolescents to take responsibility for their actions". The ultimate intent of life skills education is to promote healthy lifestyles resulting in the development of society at large. Education of life skills allows the individual to nourish his knowledge, values, and upscale views, correctly understanding the situation before reacting to it. With these skills, the individual acknowledges what, when and how to behave and execute/handle any situation. Life skill education motivates healthy behaviours and increases self-confidence. Tobler (1992) opined that "Life Skills-based education program encourages the students and develops refusal skills such as assertiveness and the most successful interactive program for skill development". Taremian (1999) proposed that "educating the life skills is one of the factors of psychological health development, and the achievement of such skills would lead to individual, social, cultural, and political evolutions".

World Health Organization (WHO) 1997 prepared a document entitled "Life skills education for children and adolescents in schools". The document aimed to outline a framework for life skills program development, both conceptually and practically. The materials focused on the teaching of life skills to children and adolescents in schools. Therefore, this document is beneficial for educational stakeholders working in the field of school curriculum development, health education in schools and communities. This record spotlighted the seriousness of life skill education for students and young people of all age groups. In this charter, WHO described, "Life skills education is relevant to everyone and similarly, the contents of this charter, as it detailed the importance of life skill education along with practicalities of the life skill education in school curriculum and health education.

Further, it was stated in the document that, although the document has directions for schools, yet it could also act as a guide while designing life skill education modules for students that are not in schools (out-of-school children), as well as for adult education and as part of community development projects". This document was divided into two parts, one having an introduction and other detailed guidelines, namely: Introduction to Life Skills for Psycho-social Competence and The Development and Implementation of Life Skills Programs. The document focused on a careful and comprehensive explanation of life skills, life skill education, and guidelines to prepare programs related to life skills and implement those programs.

1.1.4 Definitions of Life Skill Education

A Mental Health Promotion and Policy (MHP) team, World Health Organization's (WHO 1999) Department of Mental Health, analysed different aspects related to life skill education and formulated an explanation for defining life skill education. The report states, "In a culturally and developmentally appropriate way, life skills education is designed to promote the practice and reinforcement of psycho-social skills. Furthermore, it promotes the development of the individual, and prevents health and social problems, leading to the protection of human rights". Researches validated that in this contemporary world, it has become more stressful for the child than ever before, even in education and social responsibilities. More and more young people are getting addicted to drugs and indulging in several pervasive behaviours. Therefore, life skill education is essential for Indian students to promote better survival and reproductive health in a country.

Maree & Ebersohn (2002) reported that Life Skills training was designed to facilitate and reinforce skills related to mental and social abilities, thus contributing to health leading to deterrence of social problems. Students, adolescents, and even people of any age group learn and apply these new skills for living, and these skills would be entailed to enhance their productivity.

Coffey & Knoll (1998) opined that the general purpose of life skills programmes is to help persons live more successfully and function better in their multiple roles as members of a family, community and workplace. Life skills training emphasizes work, practical living skills, personal growth and management of social skills.

Life Skill Education is intended to simplify the practice and strengthen the social and emotional competencies in a culturally and developmentally adaptive way. It supports and encourages personal and social growth and acts as an assistant in dealing with future problems. In the view of Pujar et al. (2014), the life skill education interventions were encouraging for rural adolescent girls to consider safe choices and positive actions as well as enhancing their coping skills of stress and emotional stability. The findings were supported by Cutinha (2012) and Srikala & Kishore (2010). They reported that the programs on life skill education introduced among school children helped students' in managing adjustment issues in their relations with teachers and school. They further added that with improved life skills, skills such as pro-social behaviour, stress management, and self-esteem were also improved, which can easily be observed in the experimental. It means that life skill education is taught in holistic health and develops healthy relationships among society members. Hence, Life skill education is based on

teaching or helping in practising basic skills for life which equips individuals to deal with psycho-social needs and issues. In this light, Tareman (1999) stated that education of such skills to children and adolescents brings up the sense of qualification, the capacity of being effective, and the ability to face complications of life with rational thinking and problem-solving skills.

The intent of Life Skill Education is to prepare adolescents for a healthy and progressive future. Life skill education not only focused on developing skills, but also contribute in enhancing positive attitude towards self as well as others, positive work ethics and etiquette, practical communication skills, organizational skills, healthy lifestyle such as personal hygiene & nutrition. Life skills help students learn how to think and make correct decisions and prepare for responsible, independent living. Life Skill Education implies the education of students in skills, insights, and abilities that help them develop variety of personal competencies that encourage and aid them to understand a different life roles in a rapidly changing world and comprehend in each role accordingly. The education aimed to emphasis the development of human potential, the mastery of developmental tasks through the prevention of emotional and social disorders.

To put it simply, life skills education is the process of empowering students to gain an understanding of their inner potential and to nurture any hidden talents or abilities they may possess. The purpose of this type of education is to achieve an appropriate balance of skills, knowledge, attitudes, and actions.

1.2 Historical Advancements: Life Skill Education

1.2.1 Historical Advancement: across the Globe

Life Skill Education has a long history which marked its existence with child development and health promotion in many parts of the world. It was often argued that the concept of life skills came into a glare of publicity through an interactive educational approach that focused on acquiring knowledge, attitude, and skills. It is said to have been emerged in the context of an educational program used by Botvin from 1980- 84 as a prevention strategy against multiple types of substance abuse. Since then, the term life skills has been popularly used mainly in the context of health, especially in case of reproductive health, HIV/AIDS, other substance abuse related issues such as drugs, smoking by World Health Organization (WHO) in 1997 & United Nations International Children's Education Fund (UNICEF) and other national and international organizations.

Ottawa Charter for Health Promotion (1986) remarked that "to differentiate and prioritize most likely health decisions, individuals need life skill education." Further, talking about the child's rights in a Convention in 1989 (Convention on the Rights of the Child), The UN general assembly threw light on the importance of life skills in education by stating, "education should be directed towards developing the child's fullest potential." Jomtien Declaration on Education for All (1990) also emphasized the integration of life skills in education, among other essential learning tools for survival, capacity development, and quality of life.

Collaborating with the Ministry of Human Resource and Development, United Nations Educational, Scientific and Cultural Organization (UNESCO) organized a workshop on life skills education in December 1998. This international workshop was aimed to look for a life skills approach that can be integrated with the Non-Formal Education curriculum so that the out-of-school student can manage the day-to-day situations in their lives. The program was to be developed keeping the following goals in mind: to involve the staff, parents, peer group, and community to help them out of school students develop positive Qualities, to ensure the young ones are committed positively to their families, to help them solve problems co-operatively, to allow learners to handle negative pressure from their peers.

The 2000 Dakar World Education Conference remarked, "all young people and adults have the human right to benefit from an education that includes:

1. learning to know,
2. learning to do,
3. learning to live together, and
4. learning to be

The report from this conference incorporated life skills in two out of the six EFA goals. These goals are:

1. Ensure that the learning needs of all young people and adults are met through equitable access to appropriate learning and life-skill programs.
2. Improving all aspects of quality education, and ensuring excellence for all, so that recognized and all achieved measurable learning outcomes, especially in literacy, numeracy and essential life skills.

For decades various studies were conducted to analyze the importance of life skill education in everyday life. It was interpreted from different research work that the concerned education could address various issues related to child and youth

development. Results were also supported by various reviews from other government and non-government organizations. United Nations General Assembly Special Session (UNGASS) on HIV/AIDS, 2001; UNGASS on Children, 2002; World Youth Report, 2003; World Program for Human Rights Education, 2004, stressed the significance of life skill education in the wellbeing of children. The UN further validated it as they have introduced life skill education in UN Decade on Education for Sustainable Development, 2005 and UN Secretary General's Study on Violence Against Children, 2006. The 51st Commission on the Status of Women (2007) and the World Development Report (2007) working in the same field also confirmed the consequences of life skill education for all.

Table 1.1: Historical Advancement in Life Skill Education

Sr. No.	Year	Event	Agency	Highlights of the Event
1	1986	Ottawa charter for Health Promotion	World Health Organization (WHO)	realised the significance of life skills for children to make better health choices.
2	1989	Convention on the Rights of the child	The UN General Assembly	Recommended integration of life skills in education.
3	1990	Jomtien declaration on education for all	International Consultative Forum on Education for All	Highlighted the implications of life skills in education.
4	2000	Dakar World education conference	UNESCO	advocated that all youth and adults have human rights and life skill are the indispensable part of these rights.
5	2001	UNGASS on HIV/AIDS	The UN General Assembly	Supported Life Skill Education in the prevention of AIDS/HIV
6	2002	UNGASS on Children	The UN General Assembly	Supported Life Skill Education
7	2003	World Health report	World Health Organization (WHO)	Highlighted importance of Life Skill Education for overall health
8	2004	World programme for human right education	The UN General Assembly	Supported Life Skill Education
9	2005	UN decade	The UN General Assembly	Support Life Skill Education for sustainable development
10	2006	UN secretary-general	The UN General Assembly	Studied the effect of Life Skill Education and its

				effect on violence against children
11	2007	51st Commission	The UN General Assembly	On the status of women and remarked on the development of Life Skill Education in improving women status worldwide.
12	2007	World Development report	The UN General Assembly	Talked about seriousness of Life skill education

After the Ottawa convention in 1989, UNESCO, UNICEF, and WHO figured out the palpable urgency of introducing life skill education to adolescents globally. These organizations play a very outstanding job on international platforms and organize various awareness programs, workshops, seminars, child development programs, short research. Many workshops were organized and programs developed for life skill-based education by different countries' education departments, health departments, and these global organizations to teach skills and knowledge. These workshops and projects were aimed at health promotion, gender issues, environmental awareness, and vocational training for income generation using a life skill approach. Later on, the skills were introduced to informal education and focused through the regular curriculum.

1.2.2 Historical Advancement: in India

In India, the very first traces of life skill education were noticed by Bharath (2002) NIMHANS-Bangalore, who, along with the child and adolescents' health and development unit of WHO – SEARO, New Delhi, designed and developed three modules for standard eighth, ninth and tenth on health promotion using life skill approach. Their focus is on nutrition and non-communicable diseases, reproductive health and sexuality, and substance abuse. Before NIMHANS, National Curriculum Framework (NCF 2000) also underscored the necessities of life skills in education to aid students with dealing with drug addiction, violence, teenage pregnancy, AIDS, and many other health-related issues problems. Later on, in 2005, National Curriculum Framework suggested integrating Adolescent Education Programs (AEP) in formal school education. Through this program, secondary school teachers would be responsible for executing life skill-based education in the schools. The AEP was implemented by the Department of School Education and Literacy, Ministry of Human Resource and Development (MHRD), collaborating with the National AIDS Control Organization (NACO).

In 2006, the Department of Adult and Continuing Education, in collaboration with the University of Madras, and University Grants Commission, organized an International Workshop on life skill Education concerning Youth Development. The workshop's objectives were to design and develop a) training manual on Life Skills Education, b) learning modules for Life Skills Education, and c) training methods and programs for colleges and communities. The main points discussed in the workshop were that life skills are those activities that aid self-satisfaction and encourage mental and emotional health, instructing young minds to face the hardships of life. Developing life skills allows adolescents to translate knowledge, attitude, and values into healthy behaviours that improve their lives in general.

The West Bengal Voluntary Health Association (WBVHA) introduced its Adolescents health Education project in four districts of West Bengal – Calcutta, Bankura, Darjeeling, and Dakshin Dinajpur. The project was initiated in 120 schools having 80 teachers and 7200 students in all these four districts of West Bengal. The WBVHA Project intended to brush up skills and impart necessary age-appropriate information on adolescents' problems and guide them to manage these issues through effective and sustainable intervention. Through its project, WBVHA focused on critical areas related to personal hygiene, cleanliness, nutrition, understanding psycho-physiological changes during adolescents, counselling for adolescents, self-esteem, life skills, reproductive health and HIV-AIDS, gender issues, and healthy living.

In April 2013, International Labor Organization (ILO) had partnered with Infrastructure Leasing & Financial Services Limited (IL&FS), Education and Technology Services (IETS) to impart Life Skills program to the Master Trainers of NCLP (National Child Labor Project) schools under the convergence model in ten districts across five states including Bihar, Jharkhand, Madhya Pradesh, Orissa, and Gujarat. The districts were Kalahandi, Cuttack, Ranchi, Sahibganj, Sitamarhi, Katihar, Jabalpur, Ujjain, Vadodara and Surat. Four hundred master trainers from NCLP schools underwent a five-day training program across the states.

First, of its kind in India, a Post Graduate program on Life skill education was introduced in the regular PG programs of Rajiv Gandhi National Institute of Youth Development to empower youth with essential skills to excel in all walks of life.

In 2009, the Central Board of School Education had introduced life skills in the school curriculum through CCE (Continuous and Comprehensive Evaluation), which CBSE later took back in 2017. However, life skills were still a part of the school curriculum in

CBSE schools all over India. Initially, CBSE introduced Life skills for classes 6-10 through an evaluation system. However, after investigating its importance for students' mental, social and emotional development, life skills were integrated into the regular curriculum, making it a part of it. CBSE has prepared different modules for teachers to teach life skills. These modules are comprehensive and exhaustive with itemized life skills clarifications, activities, examples, and illustrations. Going a way forward, now CBSE has introduced 21st-century skills in their education system.

1.2.3 Historical Advancement: in Gujarat

In 2003, Pratham, a non-governmental organization from Gujarat, started providing learning modules to the students in Mathematics, Language, English, and Life skills in four districts of Gujarat, namely, Ahmedabad Gondal, Kadi, and Dholka in Gujarat. In 2009, Health Education and Life-skill Program (HELP) was launched by Gujarat Council for Educational Research and Training (GCERT). Under the HELP program, four districts Panchmahal, Dahod, Vadodara, and Anand, were selected for 2009-10. And for the years 2010-11, Rajkot, Banaskantha, Sabarkantha, and Ahmedabad-city were established. This program is conducted for secondary school physical education teachers. Gujarat Secondary and Higher Secondary Education Board (GSHSEB) decided to introduce a school-based Comprehensive Evaluation System (SCE) in class X from June 2012 onwards. Under this system, schools will have the authority to grant 30% marks to students for their scholastic and co-scholastic knowledge. The new procedures brief that scholastic spot will carry a weightage of 20% in mark sheet and the non-scholastic test, which includes life skills and values in students with a weightage of 10% in 1 subject or ten marks per subject. In collaboration with GCERT, UNICEF developed Life Skills Education Modules for elementary teachers to integrate life skills with schools subjects. Way made College of Education, Vallabh Vidyanagar, Anand started an elective course on Life Skills in B.Ed. And M.Ed. Programs

Along with CBSE, other school boards also incorporated Life skills at various levels of education for the overall development of a child. It has also been put into practice through other channels in the community. Life skill education enables students to develop their inner potential and knowledge, values, integrity, so it needs some focused and empirical goals. The following section will detail some of the objectives of life skill education as stated by CBSE.

1.3 Objectives of Life Skill Education

Life skill education believes in developing self-analysis, self-efficacy, and self-realization in students to face life challenges. In the words of Rao (2003), "the development of life skills is an integral part of personality development, which can be beneficial for all young adults". The main goal of LSE is to develop positive and adaptive behaviour by supporting individuals to practice and cultivate psycho-social skills that can reduce risk and capitalize on constructive behaviour (Munsi & Guah, 2014). In other words, it could be said that the overall objective is to fabricate mental well-being and satisfaction among students, making them productive members of society. Teaching-learning life skills are invariably concerned with the comprehensive development of learners. It aimed at learners' social, personal, intellectual, emotional, and physical growth and integrated components.

World Health Organization (2001) states that life skills education effectively addresses young people's psychological and social needs and helps them develop and grow into well-adjusted adults. It's a process to enhance the individual's capabilities and deal actively with day-to-day life's expectations and difficulties. It means life skill education prepares future younger ones to face future challenges in the present time. It equips students with skills and competencies which would help them to face realities of the life. Life skill education nourishes and strengthens the mind, internal willpower, and emotional stability to meet present and future demands.

Different national and international organizations working in child education, adolescents, and health education, framed other objectives for life skill education.

Objectives of Life-Skill Education as given by CBSE Teacher's Manual on Life Skills for classes IX-X (2010) are:

1. The development of knowledge, behavior, and attitudes should be the focus.
2. The majority of learning theories underline the connection between experience and practice as an important factor of learning. Thus, students should be given scenarios and exercises where they can apply safe behaviors and experience their effects.
3. If complimented with policy development, appropriate health services, community development programs, and media, Life skill education will be more effective.
4. A key recommendation from the manual was that experience-based learning works best when it is augmented or reinforced.

5. Assisting young people in recognizing and responding appropriately to real-life situations.

6. It is intended to increase social awareness and mitigate social evils.

Life Skill Education has proven very effective in empowering the young generation and solving many life issues and problems in their later life. Since school is a place where focused learning is imparted to the students, it means in schools life skills could be effectively enhanced. A school's curriculum should emphasize more than teaching students facts; it should also focus on teaching students value-enhancing Life Skills, that allow students to resist peer pressure, make informed decisions, and make healthy choices. As per CBSE Teacher's Manual on life skills for classes IX-X (2010), when young minds acquire Knowledge, Attitudes, Value Enhanced Life Skills (KAVELS), they benefit in various ways. Further, the manual stated that "Life skills equips adolescents with enhanced competencies which helps them to understand the difference between right and wrong, and make informed and better decisions, think critically and creatively, communicate effectively, build healthy interpersonal relationships, empathize with others and cope with and manage their lives healthily and productively". To put it in another way, it could be stated that skilled knowledge eventually develops optimistic behaviours that foster healthy relationships, avert disease, develop assertiveness and emotional stability and enable young people to play leadership roles.

1.4 Key Life Skills

Life Skills were organized differently by different national and international bodies working in the field of education. These itemized Life Skills were mainly based on the understanding and comprehension of the life skill concept.

The Researcher reported three different categorizations of life skills given by UNICEF, WHO and CBSE.

1.4.1 Classification of Life Skills by UNICEF

In the Indian context, UNICEF (2006) categorize Life Skills under four dimensions of skills. These are:

1. Empowerment
2. Citizenship skills
3. Learning skills
4. Skills for Employability

According to UNICEF, There are ten core life skills divided under these four dimensions.

Figure 1.1 Four Dimensions of Life Skill as given by UNICEF (2006)

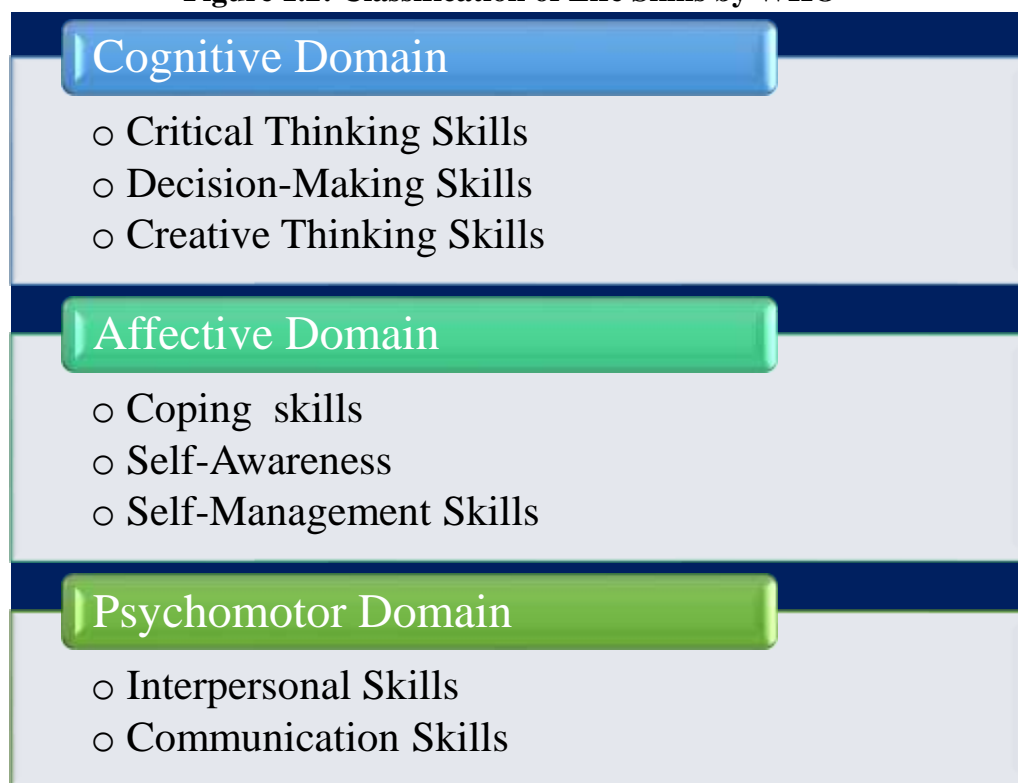


1.4.2 Classification of Life Skills by WHO

WHO (1999) categorised Life Skills under three domains, which were further classified as:

1. Cognitive Domain
 - 1.1 Critical Thinking Skills
 - 1.2 Decision-Making Skills
 - 1.3 Creative Thinking Skills
- 2 Affective Domain
 - 2.1 Coping Skills
 - 2.2 Self-Awareness Skills
 - 2.3 Self-Management Skills
- 3 Psychomotor Domain
 - 3.1 Interpersonal Skills
 - 3.2 Communication Skills

Figure 1.2: Classification of Life Skills by WHO



1.4.3 Classification of Life Skills by CBSE

Ten Core Life Skills highlighted by CBSE in Continuous and Comprehensive Evaluation (CCE) manual (2009) and considered for present work, which was also accepted by World Health Organization (WHO), United Nations International Children's Emergency Fund (UNICEF) and United Nations Fund for Population Activities UNFPA (UNICEF 2004; Module 7: Life Skill, 2011) were:

- 1 Self-awareness
- 2 Empathy
- 3 Critical thinking
- 4 Creative thinking
- 5 Decision making
- 6 Problem Solving
- 7 Effective communication
- 8 Interpersonal relationship
- 9 Coping with stress
- 10 Coping with emotion

These ten life skills are grouped under three broad categories (provided in chapter 4 of CCE Manual by CBSE)

Figure 1.3: Types of Life Skills given by CBSE

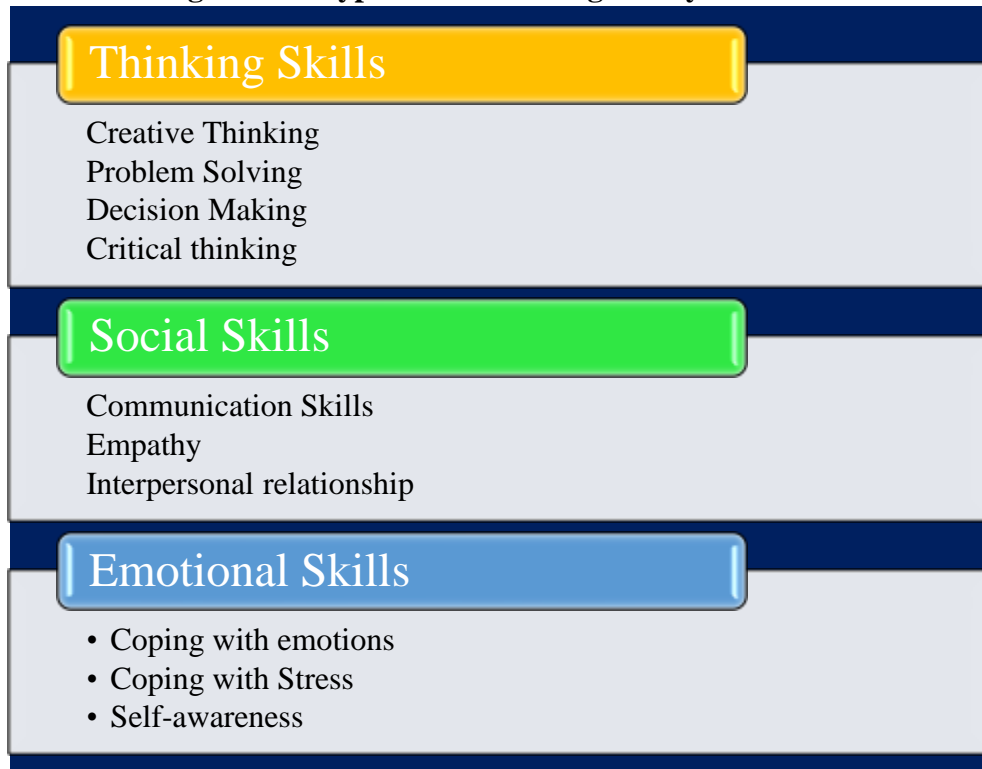


Figure 1.3 shows a cluster of ten different life skills given by CBSE under three categories – Thinking Skills, Social Skills, and Emotional Skills. These ten life skills were further detailed below as presented in CBSE Teachers' Manual – VIII (2010).

Thinking Skills: Broadly explaining, thinking skills comprehend mental exercises important for analyzing – critically and creatively, every situation and finding the most appropriate decisions. It includes: "what, how, and why". Thinking skills have creative thinking, problem-solving talent, decision-making skills, and critical thinking skills.

Creative Thinking: is a unique way to see or do things that are of four components, namely-fluency (to generate new ideas), flexibility (to shift perspective quickly), originality (to conceive something new), and elaboration (to build on others' ideas).

Problem Solving: is to deal constructively with problems in one's life. Significant issues that are left unresolved can lead to mental stress and give rise to physical strain.

Decision Making: reaching a point or deciding after analysing all the possible options and reducing perplexities and doubtful alternatives can be considered a decision-making skill. It helps to deal with decisions about one's life practically. People can be taught active decision-making about their actions about a nutritional assessment of different options in terms of the effects these other decisions are likely to have.

Critical Thinking: is the ability to analyze information and experiences objectively. Critical thinking can lead to a well-balanced way of life, help in recognizing and assessing the factors influencing attitudes and behavior, such as values, peer pressure, and the media.

Social Skills Social skills enable adolescents to be accepted in society and get social norms, which provide a foundation for adult social behavior. The skills needed to be socially adept include appreciating or validating others, building interpersonal relationships with friends and family, understanding roles and responsibilities, listening and communicating effectively. Social skills were further divided into Communication Skills, Empathy, Interpersonal Skills.

Communication Skills: enables people to express themselves verbally and non-verbally and in ways appropriate to cultures and situations. Improved communications skills aid students to remain assertive and verbalize important opinions and desires, along with needs and fears. Moreover, to ask for advice and help in time of need.

Empathy: is the ability to imagine what life is like for another person; it is an essential ingredient for maintaining a healthy interpersonal relationship in family and society. In other words, empathy is understanding others through analyzing their situations and imaging that situation with ourselves. It can help us improve social interactions, especially in ethnic or cultural diversities, by accepting others, which may differ from ourselves. Empathy can also encourage nurturing positive behaviour towards people in need of care and assistance, a

Interpersonal Skills: to relate with others and interact with people in positive ways. This may mean making and keeping friendly relationships, which have significant importance to mental and social well-being. It includes maintaining good relations with family members who are the most important source of social support and ending relationships constructively.

Emotional Skills: Managing emotions, stress, building healthy and positive relationships with others, mental, behavioural, and emotional stability by analyzing and exploring self; defines emotional skills. According to CBSE, Emotional mastery is further categorized as:

Coping with Emotions: means recognizing the emotions within oneself and others, aware of how emotions influence behaviour and responding appropriately. Intense emotions like anger or sadness might have negative consequences on health if not responded to appropriately.

Coping with stress: means understanding the sources of stress in one's life, its effect on one's health, and how to act in a way that helps control stress levels by changing one's environment or lifestyle and learning how to relax.

Self-Awareness: includes the recognition of 'self, one's character, strengths and weaknesses, desires and dislikes. The development of self-awareness can help recognize and when one is stressed or under pressure. This is often a prerequisite for effective communication and interpersonal relations, as well as to develop empathy.

1.5 Status of Life Skill Education in India

Bharatha, in 2002 from NIMHANS-Bangalore, while working in collaboration with WHO's child and adolescents' health and development unit (New Delhi), developed three different modules for eighth, ninth and tenth, which were primarily based on life skill education. This was the first footmark of life skill education in India. Later, various national educational bodies appreciated and acknowledged the importance of life skill education and recommended integrating it into regular schools. National Curriculum Framework (NCF, 2005) suggested that "Life skills such as critical thinking skills, interpersonal communication skills, negotiation skills are the competencies necessary to direct and guide children to face the challenges of everyday life".

Central Board of School Education (CBSE) has introduced life skill education in 2009 through class 6 and eventually extended it up to class 10. It was familiarized with CCE as an assessment criterion during its trial phase but subsequently integrated with the regular school curriculum. Different modules detailing all the life skills and activities related to each life skill for other classes were prepared by CBSE for the teachers to teach life skills. Later, various state and central boards introduced life skills education into their curriculum to varying levels of education.

With countless initiatives on life skill education from educational bodies in India for the well-balanced and futuristic development of the child, still life skill education, a challenge in the Indian education system. There are innumerable reasons for the abysmal status of Life skill education in India. Ramakrishnan (2010) stated in her study that in most schools in India, Value education is misapprehended with life skill education and more valued in the schools when compared to life skill education. Subitha (2013) studied the status of life skill education in the government schools of Tamil Nadu and found vocational education was given to the students in the name of life skill education. Fabricating dolls, stitching dresses, and making candles and napkins, just like vocational

training, was offered to the girls under the life skill education program of Sarv Shiksha Abhiyan. A report from Centre Square Foundation on Life skill education in India (2015) reported a few significant challenges faced by life skill education in India. According to the report, teacher mindset, lack of trained teachers, shortage of quality life skill intervention programs, perspective issue (mostly confused with value education), lack of the research base in context with developing countries, and so on, were the significant challenges for life skill education.

There are many policies and guidelines on the way of emergence, from educational authorities (nationally and at the state level), to integrate life skill education in regular college and university curriculum and the school curriculum. National Education Policy (2020) also proposed life skill education as a compulsory part of the school and university curriculum. In 2019, University Grant Commission (UGC) introduced the Life Skill curriculum (Jeevan Kaushal) for higher education institutions. Besides the quantum of initiatives by several educational agencies in the country, the status of life skill education is, however, a doubtful concern.

1.6 Academic advancements in life skill education: Indian context

1.6.1. Amalgamation of Life Skill Education in Formal School Setting

Teaching-learning Life Skills involves experiencing skills and values that strengthen physical, social, personal, emotional, and cognitive development. Although these skills were inter-linked yet, different life skills needed different methods of learning, such as creative and aesthetic skills needed dance, music, drama, and visual art activities. According to WHO and UNICEF, life skill education is an educational intervention designed to address life skills focus areas with needs- and outcome-based participatory learning. Life Skill education steered the learner to accept the possible challenges of life and lead a prosperous and satisfying life. The view was supported by Gamble (2006); Junge et al. (2006); Sterling (2006); Madhu (2008); Bharath & Kumar (2010); Garg (2011); Ozaeta (2011); Kumar & Chhabra (2014).

This techno-driven world, where adolescents are more deviated towards technology and lack family culture and social values, implies stress and emotional instability. In the educational institution, students have different family backgrounds and unique character characteristics such as their attitude, interest, and aptitude, and they interact with the school in unique and different ways, such interactions may be productive and healthy or unhealthy and destructive. It depends on the teacher how they change their students'

incompatibilities into compatibilities and develop their personalities into tomorrows' leaders. Life skills in education embellish the teaching process and help teachers develop students' social, emotional, creative, and critical skills. Reed (1994); Waltemire (1999); Thurston (2002); Shangold (2004); Lynch (2007); Kenneth (2008) observed in their research that life skill education contributes a noticeable share in producing intellectually, emotionally and mentally robust youth. In the same line, Scott & Jenifer (2009); Nejad (2010); Richard & Kumaravel (2014); Sardesai et al. (2014) reported that life skill education prepares the young mind to accept hardships and analyze, comprehend and then act in any situation.

Teacher's Manual on Life Skills classes IX-X (2010) prepared by CBSE emphasized the importance of life skills in education by stating: "An individual's ability to be innovative, adaptable, and imaginative is enhanced through improving thinking skills. Rather just accepting everything that comes their way, they ask questions and think critically, discovering and analysing issues. Social skills enable a person to display the ability to recognise, communicate, and respond empathically to the emotions of others. Someone with improved emotional awareness can detect the causes and consequences of stress on themselves, as well as design and implement multi-faceted stress management solutions." The focus of introducing Life Skills Education in regular curriculum is:

1. to strengthen the students' affective domain
2. to cultivate self-assurance, eco-sensitivity, and appropriate approaches to physiological functions, among other things
3. to improve cognitive comprehension

The National Curriculum Framework (NCF, 2005) also emphasised the integration of Life Skill education in schools. A school is an ideal environment for the delivery of Life Skills Education, according to NCF, since it is among the most significant entities for socialising children. NCF pointed out that, school has its own role to play in the application of life skill education as:

1. It is among the most significant authorities for socialising children.
2. It has a great potentiality to give them access a variety of perspectives during their developmental years.
3. It keeps in touch with the parents and community stakeholders at all times.
4. It has trained teachers to implement the Life Skills programme to students and assist them in becoming more personally liable, fit and active, and resourceful grown-ups.

The psycho-social goals of life skill education necessitate a curricular structure that provides experience and abilities as well as conduct, attitudes, and ethics. This has prompted more engaging pedagogical practices and different approaches to be used in the delivery of life skills education. Chaudhary et al. (2008); Lineo (2009); Malayankandy & Usha (2009) highlighted in their study the importance of integration of Life Skill education at both primary and tertiary education to strengthen the quality of education and assist teachers in the instructional strategies.

1.6.2 Amalgamation of Life Skill Education with regular School Curriculum

Class VI from the 2003-04 academic year, and class VII from the 2004-05 academic year, were infused with Life Skills Education, by Central Board of School Education (CBSE). The CBSE has introduced it as an individual subject. The transaction should be through traditional modes of learning, co-curricular activities, and other informal approaches to learning. According to the Teacher's Manual on Life Skills classes IX-X of CBSE (2010), it was alleged that students were believed to benefit from life skill education by resisting consumerism and facing life with conviction, confidence, and skills. Later, after analysing the seriousness of Life Skill education for the overall wellbeing of students, other states, national and international boards in India also introduced Life Skill education in their school curriculum.

CBSE introduced components of Life-Skills in the formal modes of learning such as Language Textbooks, Science- Textbooks, and Social-Science Textbooks.

Researcher tried to integrate life skill education with the components of Science at the secondary level, with an aim to evaluate and comprehend the effectiveness of both the subjects with respect to each other.

1.7 Science and Technology at Secondary Level

Science plays a vital role in the development of society at large. No doubt all the subjects are equally crucial for the overall growth and development of a child. Still, Science and technology have their responsibility to fulfil the scientific and economic development of the country. The Secondary stage is a stage that reports high drop-out and attrition rates in science and technology subjects, and most of the research found a lack of interest in science and technology subjects as one of the crucial reasons for this drop-out. National Curriculum Framework (2005) observed, "for any qualitative change from the present situation, science education in India must undergo a paradigm shift. Rote learning should be discouraged. Inquiry skills should be supported and strengthened". Further, the NCF

remarked that it should be the prime responsibility of the schools to give due emphasis on co-curricular and extracurricular aspects in the overall school curriculum, even if these elements are not part of the external examination system. These elements should be supplemented with an intention to incite creativity, inventiveness and investigative abilities among students.

Similarly, in the same line, NCERT in 2006 stated that "the students at secondary stage should be involved to learn science as a composite discipline. At this stage, students should be connected with the practicalities of scientific concepts along with the tools and techniques. They should be involved in different activities including issues related to surrounding environment and health." NCERT added, "different aspects related to Science and technology concentrating on local needs and demands should be the part of the curriculum at the secondary stage. Systematic experimentation as a tool to verify theoretical principles should also be instigated in the curriculum at the stage". Further, NCERT remarked that the beginning made at the earlier stage to introduce Science as a discipline needs to be further strengthened at the secondary level, and perception of concepts, principles and laws of Science included in the curriculum should be appropriately detailed and not only mere formal definitions. It was pointed by NCERT in the same document, "There is a need to reduce the curricular stress for the additional elements in Science and technology and the organization of science content around various themes. In the science curriculum, concepts that are beyond direct experience may become important at the secondary school stage, and here, the critical ability is required to evaluate the epistemological status of facts in Science since not all phenomena are directly observable, where inference and interpretation are required".

Various committees and commissions from secondary commission to science education committees to National Curriculum Framework to National Policy on Education, government and non-government organizations working in science education, private reports such as PESA; every-one highlighted the importance of purposeful, concrete, analytic and realistic situational teaching-learning strategy for science teaching. Dey (2014), Lodh (2014), Karim (2018) reported the need for better science pedagogy and student centered curriculum to tackle the challenges for quality science education. According to the report of India's first National Science Survey NSS, India Science Report (2004), "science education needs to be strengthened with respect to methods of teaching, teacher quality, and infrastructure". In other words, Science as the country's backbone in the global arena needs to be strengthened at the secondary stage.

1.8 Importance of Science and Technology

Science and technology subject does not need special introduction or importance anywhere. Relevance to students' lives and universal applicability, science education is one of the most critical and indispensable parts of education due to the analytical, inquiry-based, creative, problem-solving, critical thinking, and much more skills-based developmental importance in primary education. Allowing the students to generate ideas, intelligently weigh decisions, and understand the evidence behind public policy-making is considered lifelong skills.

Science education in India was identified to be far from achieving the goal of equity, where competence is developed. Still, inventiveness and creativity are not encouraged, and the fundamental problems of science education point towards the overpowering examination system. The Science curriculum performs a significant role as an instrument of social change to decrease the gap related to economic class, gender, caste, religion, and region. The primary tool for equity can be the textbook since, for a great majority of school-going children, it is the only accessible and affordable resource for education and an alternative book writing in the country within the broad guidelines of the national curriculum framework suggested. As an opportunity equalizer, Information and Communication Technology (ICT) is also an essential tool for bridging the social divides by providing information, communication, and computing resources in remote areas. Supporting and strengthening inquiry skills by language, design, and quantitative skills for a qualitative change was suggested in learning Science (NCERT, 2006). According to Shukla (2005); Dey (2014); Lodh (2014); Karim (2018), there were many reasons behind the declining science education and foremost reasons includes: decreasing satisfaction of students with the teaching of Science in the higher classes in school and most of the science teachers were found ignorant about innovations in Science and lack in professional training and orientation courses meant for them.

Science education has a variety of title roles to play in secondary education. It is knowledge-oriented as well as skill-oriented and focused education. Science education not only imparts knowledge instead also creates understanding. Before the British era and even before the Mughal period, science education has its due recognition in society and hence in its thriving stage. It was not much strengthened during the British period, but every government tried its best to develop science education after independence. From time to time, various committees and commissions were formed to review the status

of science education, frame its objectives, understand its developments, and many more reasons for boosting science education in the country.

1.9 Objectives of Science and Technology at Secondary Level

Since science education got some considerations from different commissions and committees, various objectives were framed. These objectives were modified with time and demand.

According to the National Council of Educational Research and Training (NCERT 2006), the objectives of teaching Science at the secondary level are as follows:

1. Know the facts and principles of Science and its application, consistent with the stage of cognitive development.
2. Acquire the skills and understand the methods and processes that lead to the generation and validation of scientific knowledge.
3. Relate to the natural environment, local and global, and appreciate the issues at the interface of Science, technology, and society.
4. Acquire the requisite theoretical knowledge and practical technical skills to enter the world of work.
5. Nurture the natural curiosity, aesthetic sense, and creativity in Science.
6. Imbibe the values of honesty, integrity, cooperation-operation, concern for life, and preservation of the environment. Cultivate scientific temper, objectivity, critical thinking, and freedom from fear and prejudice.

Above mentioned objectives were few in line; there are several aims and goals for science education that need attention to improve the overall status of Science at the secondary level. As observed by Moeed in 2013, Science and technology entailed a better pedagogical approach, curriculum understanding, and assessment. Science curriculum drafted with advanced, goal-oriented, and need-based objectives transacted through best pedagogy boost science and technology learning at the secondary stage.

1.10 Integration of Life Skill Education and Science and Technology Subject

Research has proved that the simple lecture method or teacher-oriented method in the teaching-learning process of any subject didn't yield many satisfactory results in the end. Similarly, pedagogics of Science and technology also necessitate developed and advanced approaches. According to NPE (1986), "Science is a systematic process of learning". The development of Science and technology over the years is associated with the teaching and learning primary science subjects at the secondary level, such as

Physics, Chemistry, and Biology. The science curriculum is also planned to enable the teacher to use an activity-oriented, child-centred approach (guided inquiry) to teach. It is intended to strengthen the commitment to exploration, curiosity, objectivity, scientific outlook, open-mindedness, etc. There is a strong need to adapt and integrate innovative methodologies to local contexts and curricula and develop materials and other resources to improve science education in schools to enjoy learning Science not as a subject but as a day-to-day part of their lives. Studies conducted by Shamsudin et al. (2013); Pillai (2013); Mehta & Kulshrestha (2014); Ahmad & Rai (2015); Katsampoxaki et al. (2015); Kumari (2002); Kurbah (2015); Eisha (2020) focused on different strategies for teaching Science and observed unquestionable results.

Science should be taught with life skills to stimulate creative thinking and develop problem-solving skills in students. Introducing Life Skills Education in Science leads a new perspective to educate our young generation in a fun, exciting, and engaging manner. Life Skills Education brings the idea of integrating Science with emotional and social education elements by exploring themes like honesty, teamwork, and flexibility. Since Science, in other words, is interpreted as asking questions and finding answers to those questions, these are the same skills that everyone practices in their daily lives while attempting to comprehend simple questions. In the views of Bandura (Bandura's Social Learning Theory), skills are learned through interaction, processing, and structuring of experiences (reported by Prajapati et al., 2017). Therefore, life skills are designed to be taught through experiential learning such as role-play, modelling, and practice. The pedagogy for transacting life skill education must be interactive and experimental. The Life Skill approach emphasizes "Learning by Doing", which is analogous to learning of science and technology subject.

According to United Nation's children fund (UNICEF, 1999), "Teacher has a pivotal part to play while presenting skill-based education especially, life skill education. The teacher has to facilitate participatory learning integrated with other modes of teaching-learning strategies such as lecture method, play-way method and experiments to achieve learning objectives of life skill education". Further, UNICEF added, "Participatory learning utilizes the experience, opinions, and knowledge of group members; provides a creative context for exploring and developing possibilities and options and affords a source of mutual comfort and security that aids learning and decision-making process".

American Association for the Advancement of Science (AAAS, 1993) suggested that "students should understand the importance of curiosity, honesty, power of questioning,

openness, and scepticism in Science and how these are blended with the methods of science learning and understanding. By the end of the 12th grade, students should, not only, learn the value of these skills in Science but also exhibit them in their own lives". Furthermore, AAAS mentioned, considering these values, attitudes, and skills, as integrated, can be thought of as habits of mind because they all relate directly to a persons' outlook on knowledge and learning and ways of thinking and acting.

The Researcher conducted the pre-study survey to know the status of life skills education and the scope to integrate it with science education in the CBSE schools of Vadodara city. The Researcher has visited nearly fifty per cent of the CBSE schools of Vadodara city. In CBSE schools, life skills are taught as a separate subject. The Researcher observed that schools are not integrating life skills with issues, even they are not teaching the subjects through life skills or life skill-based activities, and teachers are not employing different methods or life skill activities to teach. Students understand the content, but they do not understand its importance; they do not understand the role of scientific inquiry in comprehending science concepts for the understanding world around them. It is essential to develop the importance of Science in students' lives, the role of scientific inquiry in increasing knowledge of the world around them, and confidence in making reasoned and evidence-based decisions about the current and future and influence of science and technology, including ethical considerations. Students' situation analysis power and problem-solving abilities should be enhanced through life skill-based activities included in life skill education. The core idea behind the integration of life skill education in science subjects is to teach students how to think, evaluate, judge, process information, and come to rules and conclusions.

1.11 Rationale

The world is changing dramatically over the past decades. This sudden and abrupt change (positive or negative) is not limited to only one sector; instead, every aspect of life is in transition. These physical, psychological, emotional, and social changes may lead to social and emotional adjustment problems, conflicts, stress, and many more health issues in an individual's life, especially during the adolescent period. Adolescence is a stage where life is in a significant transition and may bring problems and conflicts if not directed with proper knowledge, supervision, guidance, and counselling. Thus, considering the importance of the adolescent period, education needs an updated version integrated with the necessary expertise, including knowledge and life experiences

(because education is the only tool to bridge the gap created by any social and technical change). Such detailed needs of the young ones necessitate the introduction of life skills in education since life skill education is one of the most significant preventive measures to deal with adolescents and their problems worldwide. According to NCF (2005), the development of life skills has an essential role in understanding the demands and challenges of everyday life. Further, the NCF stated that the life skill curriculum must have practical aspects of life skills and experiences of varied kinds for the students to learn life skills. In addition to academics, it is crucial to introduce age-appropriate and context-specific interventions programs for the adolescents to aid them with necessary skills that help them cope with the concerns related to the process of growing up.

In continuing words, NCF (2005) stated that life skill education will contribute to the student's average growth and development. When introduced into students' lives, life skill education can teach values, basic fundamentalist concepts, skills, and creative expression. The above point stated by NCF was validated by the number of researchers (Shechtman et al., 2002; Grover, 2006; Helaiya, 2010; Johnson, 2012; Rajeswari, 2014; Tariq, 2014; Khirwadkar & Eisha, 2016; Pandya, 2019) in their research. They remarked that life skill education could address growing depressive symptoms and academic stress in school-going children, which intensified the seriousness of life skill education for teachers' training. It was marked by UNAIDS (2003) that in the school curriculum, life skill education has its part to play in the daily needs of adolescents' life that authenticated with the indications that it helps in dealing with the issues of school drop-out, indiscipline, and adolescent pregnancies. It means that school is an appropriate place to yield the best results of life skill education at the secondary stage. At schools, where students spend one-third of the day and a large part of their productive time, overall and comprehensive blooming could be fostered by integrating life skill education with a regular curriculum. Owing to such an enriched curriculum, the teacher helps the student identify their strength and help them develop their skill by acknowledging and encouraging their positive behaviours, especially at the secondary stage.

Secondary education is one of the most crucial and experimental stages in academic life, which succeeds elementary education and precedes higher education. The Secondary stage is a very influential period for the students because, during this stage, they feel the thirst for knowledge, and their mental abilities are in a developing phase. According to Piaget's theory of cognitive development, The secondary stage is a formal operational stage. It is a stage when students develop the ability to think about abstract concepts,

could be able to reason out things, and capable of hypothetical and deductive reasoning. The early developmental years of adolescence, which is from age 10 to 14 years (secondary stage), are critical in building skills and positive habits for young children's mental and social well-being. Students are curious to know the answer to "what, why, and how" at the secondary stage. With the development of life skills through life skill education, students might realize the importance of analyzing each situation to understand the answer themselves. Students could have deviated from their path at this particular stage if they were not guided with the right and proper information; their minds were full of questions, and if they were not rightly answered, they could be harmful.

Life skills education plays an indispensable role in creating awareness and providing guidance and direction to the students at the secondary stage. Furthermore, this approach empowers them with decision-making skills, promoting mental well-being and competencies to equip them to deal with the realities of life, as stated by CBSE in 2010. At this age, critical thinking, recognition of self, problem-solving skills, and the development of skills and competencies vital for the development of the sense of identity were the essential aspects, most of the time ignored among students. Maslow's theory of motivation also highlights the significant role of class discussions, peer tutoring, productive classroom ambience and argues that teachers should allow students to construct knowledge, develop self-esteem among students. As highlighted by CBSE (2010), the goal of Life Skills Education for secondary students is to develop accurate, objective, and scientific knowledge, attitudes, and value-enhanced life skills equipped learners. The students address knowledge, attitudes, and value-enhanced life skills through a behaviour development approach with adequate and age-appropriate content delivery (life skill education).

The life skills can be illustrated through every subject, like interpersonal skills and effective communication; languages can be helpful to encourage reading, writing and interaction with other students. Different methods can be adopted for teaching life skills like activity-based and sharing examples for making them understand the importance and application of their routine, like the part played by scientific inquiry in improving comprehension abilities to understand the world around them and so on. Kumari (2002) and Venkatesh (2009) tried to introduce life skills with mathematics education. Gafoor & Shemi, in 2007, worked on studying the impact of study skills on the achievement of biology subjects. Much more research work has been done to substantiate the significance of life skill education. Life skills integrated with Science encourage learning

skills such as curiosity, problem-solving and scientific temper, along with learning science and critical thinking. With technological advancements, various challenges arise and the benefits that can be effectively dealt with illustrations of life skills education in the school curriculum for students. The study on life skills from the perspectives of classrooms and teachers expressed that science courses have a significant setting to teach life skills. It was analysed from different studies that the teachers used some in-class and extracurricular activities to teach life skills (Kurtdele-Fidan, & Aydoğdu, 2018).

Lack of scientific skills, problem-solving skills, curiosity, critical thinking skills in Science were also most leading reasons for declining science education at secondary and higher secondary school. Researches in science education show that students in science classroom feel an absence of concentration, motivation, and curiosity, which leads to stagnation in the development of science education at the secondary level. Researchers (Karim, 2018; Prateek & Kamath, 2015; Johnson & Ramachandran, 2012; Dey, 2014; Lodh, 2014) observed a few reasons behind this dearth, such as dull and meaningless classes, unable to relate the science concepts with a real-life situation, teacher-centred classrooms, teachers following procedural knowledge. They suggested that different integrated student-centred pedagogical approaches were needed during the teaching-learning to boost scientific skills, which may encourage interest in Science among secondary students.

With the introduction of Life Skill Education in Science and technology, creative and inquiry-based student-centred learning should be encouraged, and inquiry skills will be supported and strengthened. Integrating life skill education with classroom lessons and field investigations in science subjects will make the learning experiences more prosperous and more meaningful for students. Through such blended science education, students will be able to enhance and learn skills related to Science as well as science content. Learning science concepts with an integrated approach engage students actively and enthusiastically, thus developing a profound understanding of content knowledge. Eventually, compelling and exciting involvement of students with Science will likely support students to intensify their interest in Science and also have more positive attitudes towards Science. It is a new and refreshing way to look at Science as a subject as such approaches can bring just enduring understanding in abstract scientific concepts. They help every learner experience and learn them through an innovative kinesthetics way. Considering Science signifies more about asking questions and finding solutions to every possible question, skills like problem-solving, inquiry, decision making, thinking skills

play a crucial role. According to CBSE Teacher's Manual on Life Skills classes IX-X, the process of transfer of knowledge is made simpler through KAVELS (Knowledge, Attitudes, Value Enhanced Life Skills) approach. This approach, which the Central Board of Secondary Education is following, aims to provide "accurate, objective and scientific knowledge" and be mindful of the fact that the content should be age-appropriate and directed towards the sensitivity of young minds. It is of substantial importance to make students understand the significant role played by Science in their lives, the responsibility of scientific skills in guiding students to appreciate the world around them and to develop confidence in making reasoned and evidence-based decisions about the current and future and influence of Science and technology, including ethical considerations.

The Researcher has pre-planned an informal survey in CBSE schools of Vadodara city to comprehend the status of life skill education and teaching-learning method used for science and technology subjects. The survey has five questions related to teaching-learning of life skill education and science and technology subjects. The Researcher has visited nearly ten CBSE schools of Vadodara city. In CBSE schools, life skills were introduced as a separate subject, and in some cases, even the classes were only on paper and, if taken, were not regular. The Researcher experienced that schools were not integrating life skills with subjects, even though they were not teaching the subjects through life skills or life skill-based activities. Teachers were not employing different methods or life skill activities to teach. Students understand the concept of life skills, but they do not understand its importance as they cannot relate it with their daily life situations; they do not comprehend the role of scientific skills in understanding the world around them. The Researcher also assessed a considerable gap between the life skills manual and the implementation of that manual in schools. Further, the Researcher also observed that teaching science and technology subject was primarily restricted to lecture cum demonstration method where experiments were managed mainly by the teachers and students were found to be mere observers.

The integration of life skill education in science and technology subjects is a far-reaching step for developing critical thinking, evaluation, judgment, information processing, inferencing, and scientific inquiry in secondary students. This integrated approach helps them understand more effectively the world and make decisions based on reason and evidence. This integrated teaching-learning approach should enhance students' abilities to analyse and understand any situation and problem-solving competencies. The core

idea behind the integration of life skill education in science subjects is to provide a helping hand and guide students on thinking, analyzing, evaluating and judging, processing information and then coming to rules and conclusions. While teaching science and technology subjects in regular classrooms, mostly thinking skills were used, such as critical thinking, problem-solving, creativity, etc. However, social and emotional skills mainly were neglected to some extent. So, the investigator in this study also focused on developing other two types of life skills, such as social & emotional skills. On visualizing all the above aspects, the investigator felt a dire need to take up a study at the secondary level. The present study was proposed for secondary school students (particularly at IX standard) of the Central Board of School Education in Vadodara city. This study aimed to expose the students to different life skill-based activities integrated with science and technology content (selected topics) for the first semester of their schooling at IX standard. The effectiveness of life skill-based activities on students was studied through this study and pre-assumed that life skill-based activities possibly result in the improvement of understanding of science concepts and the development of life skills in students.

1.12 Research Questions

1. How can the components of Life Skills be integrated with the topics from science subjects?
2. How does understanding the science concepts help in improving Life Skills?
3. How effectively do Life Skills support Science concept understanding?

1.13 Title of the Study

Developing and Implementing Life Skill Based Activities in Science and Technology Subject in CBSE Schools of Vadodara city

1.44 Objectives of the Study

Following were the objectives of the study:

1. To develop Life Skill-based Activities in Science and Technology subject for class IX.
2. To implement Life Skill-based Activities for class IX in Science and Technology Subject.
3. To study the effectiveness of life skill-based activities in terms of students' achievement in science and technology subjects.

4. To study the effectiveness of life skill-based activities in terms of improvement in life skills.
5. To study the opinion of students about implemented Life Skill-based activities in Science and Technology at class IX.

1.15 Hypothesis

Following null hypotheses were formulated for achieving all the objectives highlighted in the objectives section:

H01: There will be no significant difference in the post-test mean achievement score in Science and Technology subject of class 9 students of Experimental and Control group.

H02: There will be no significant difference in the Mean achievement score in the Science and Technology subject of class 9 students of the experimental group in pre-test and post-test.

H03: There will be no significant difference in the Mean achievement score in the Science and Technology subject of class 9 students of the control group in pre-test and post-test.

1.16 Definition of the Term Used

Life Skills-based Activities: The life skill-based activities include various learning activities prepared on selected concepts such as tissue, types of tissue, force, cell organelles, water; from the subject of science and technology at class IX. The activities comprised role play, quizzes, hands-on projects, discussions, surveys, debates, etc., looking into the scope of thinking, emotional and social skills. Considering the nature of the content, activities were developed and it was taken care of that designed activities should also supplement content knowledge along with developing life skills.

The designed program in the form of life skill-based activities aimed to enhance the students' conceptual understanding by supplementing different learning experiences through activities and developing life skills among students.

1.17 Operational Definition

Effectiveness: The effectiveness of the present work was studied in terms of the understanding of the learned concepts, which was measured as the significance of the difference between the post-test mean scores of the experimental group and control group with respect to the given treatment through developed life skill-based activities. The effectiveness was also interpreted as the improvement in life skills of the experimental group after the treatment.

Achievement: Achievement in the present study was measured by administering a situational test. The test was constructed by the researcher on the IX standard science concepts from the first term course.

1.18 Delimitation of the Study

The study was delimited to the following:

1. The study was delimited to class 9th CBSE Schools of Vadodara City.
2. The study also delimited to ten core life skills, namely self-awareness, empathy, critical thinking, creative thinking, decision making, problem-solving, effective communication, interpersonal relationship, coping with stress, coping with emotions, as given in the CBSE manual life skills for IX standard.
3. The study was also delimited to the selected topics from the first term syllabus of Physics, Chemistry, and Biology in the standard IX CBSE Science & Technology textbook.

1.19 Conclusion

The present chapter explained life skills, historical background, status, integration in education, particularly in Science, justification for the study in the form of rationale, research questions, objectives and hypotheses. The next chapter contributes a literature review related to life skill education and related research on science and technology subjects.