DEVELOPING AND IMPLEMENTING LIFE SKILL BASED ACTIVITIES IN SCIENCE AND TECHNOLOGY SUBJECT IN CBSE SCHOOLS OF VADODARA CITY

AN ABSTRACT

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1. Introduction

Education is the course of development 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. Education, specifically science education, enables the transformation of an individual with rejuvenated ideas, beliefs, skills, creativity, and understanding. Science is not only a subject; it is an interaction with nature, communication with the physical and biological environment, observation, and experimentation of different fundamentals of life. 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 todays' 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. Still, life skill education and formal education could be effective solutions to bridge the gap. As Niranjana & Mythili in 2012 stated, "in the present circumstances, youth, as well as children, are facing difficulties in life. These difficulties are giving rise to many psychosomatic problems". Considering the adolescent stage as a crucial stage of emotionality, some psychological interventions consisting of various Life Skills will need a good quality of life.

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 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 scientific skills also include some the life skills

such as creativity, problem-solving skills, thinking skills, it would help develop life skills through science and technology subjects.

2. Concept of Life Skills and Life Skill Education

The concept of Life skill and Life Skill Education is adaptable and includes wide range of skills which can be implemented according to the needs and demands of the society. Since past three decades, the concept emerged as an important viewpoint among national and international educational bodies for the emotional, social and educational development of young generations.

2.1 Life Skills

The World Health Organization (1997) has defined life skills as, "the abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life". 'Adaptive' means that a person is flexible in approach and is able to adjust in different circumstances. 'Positive behaviour' implies that a person is forward looking and even in difficult situations, can find a ray of hope and opportunities to find solutions. The life skill approach combines knowledge, attitudes and skills into actual abilities – i.e. "What to do and how to do it". Rychaen and Salganik (2001) defined life skills on three general criteria, namely a) key competencies contribute to an overall successful life and a well-functioning society, b) instrumental at meeting important challenges in a wide spectrum of relevant contexts, and c) are relevant to all individuals. These key competencies includes: a) functioning in socially heterogeneous groups, b) acting autonomously and c) using tools interactively. In other words, with the help of life skills, one is able to explore alternatives, understand and weigh pros and cons and make rational decisions in solving each problem or issue as it arises.

2.2 Life Skill Education

The Mental Health Promotion and Policy (MHP) team in World Health Organization's (WHO 1999) Department of Mental Health has given this definition of life skill Education: "Life skills education is designed to facilitate the practice and reinforcement of psychosocial skills in a culturally and developmentally appropriate way; it contributes to the promotion of personal and social development, the prevention of health and social problems, and the protection of human rights". According to Srikala and Kishore (2005), life skills education can be seen as empowering adolescent to take more responsibility for their actions. Education of life skills enables the individual to flourish their knowledge, values and views, meaning that the individual knows when and how to do a

task. Life skill education motivates healthy behaviours and increase self-confidence. Taremian & Mahjuie (1999) proposed that educating the life skills is one of the factors leading to the development of psychological health and the achievement of such skills would lead to individual, social, cultural and political evolutions.

Life Skills Based Education (LSBE) is an approach used to address specific content to achieve a certain goal (UNICEF, 2003). Life Skill Education aims development of positive behaviour and growth of the self-empowerment.

3. 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. 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

4. 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. Shukla (2005) reported that while addressing the then National Institute of Sciences (now INSA), Nehru stated, ―Who can afford to ignore science today? At every turn, we must seek it, and the whole fabric of the world is of its making. To succeed in school and beyond, science education enables students to acquire necessary skills and knowledge through technological literacy, Critical Thinking, and problem-solving.

5. Integration of Life Skill Education and Science and Technology Subject

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 is about asking questions and finding answers, these are the same skills that we all use in our daily lives as we try to figure out simple questions. In the views of Bandura (Bandura's Social Learning Theory), skills are learned through interaction, processing, and structuring of experiences (reported by Aparna & Raakhee, 2011; 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.

6. Rationale

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 an 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 the learning of 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 (Kurtdede-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 the stagnation in the development of science education at the secondary level. Researchers (Karim, 2018; Prateek & Kamath, 2015; Kalu-Uche, N. et al., 2015; Wangpo, 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. 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. Students will be learning the skills related to science as well as science content. Learning science concepts with an integrated approach engage students actively and thus develop a deeper understanding of the content. Finally, active engagement with science will likely lead students to become more interested and 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 innovatively kinesthetics way. Since science is about asking questions and finding answers, these are the same skills that we all use in our daily lives as we try to figure out simple questions. 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 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. Students' abilities to analyse and understand any situation and problem-solving competencies should be enhanced through this integrated teaching-learning approach. 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 were mostly 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.

7. Title of the Study

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

8. 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.

9. 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.

10. Definition of the Terms 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. Activities were developed according to the nature of the content. It was taken care of that the designed activities should also supplement content knowledge and comprehend proficiency in 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.

11. 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 first term course.

12. 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.

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.

13. Review of Related Literature

The categorization of the reviewed literature should be understandable and highlight the required fields of the present study and focus on shortcomings of past work and expected perspectives for future work.

Literature reviewed for the present study was categorized under the following categories:

1. Studies on Life Skills Education for Behavior Development
2. Studies on Life skill Education for Social and Emotional Development
3. Studies on Life skills Education through the Formal Education System
4. Studies on Life skill Education through different Subjects
5. Studies on Teaching-Learning of Science and Technology

In all, the researcher reviewed almost 196 studies. The studies were primarily experimental, carried out generally with pre-post design, including few exceptions (survey, case study, theoretical or conceptual). Most of the studies reviewed under different sections were related to developing behavioral and social problems in adolescents. Almost all the studies reviewed above supported using a practical approach in the teaching-learning process in science & technology subjects, and integrated education yields even better results.

14. Implications of the Review of Related Literature

The Life Skills programme promoted positive social adjustment at elementary schools, improved academic performance (Elias et al., 1991), and prevented tobacco and alcohol use (Botvin, Griffin, Paul & Macaulay, 2003). For adolescents, Life Skills-based intervention improved impulsive control (Caplan et al., 1992), developed self-management skills (Anderson and Moore, 2009), prevented peer rejection, reduced bullying (Mize & Ladd, 1990), improved teacher-student relationships (Thurston, 2002), reduction in drug use (Botvin & Griffin, 2012), increased self-esteem and decreased depression (Buhs, 2000). In addition, these approaches improved AIDS-related knowledge topics and positive perception of condom use and had more realistic

perceptions regarding susceptibility and seriousness about HIV / AIDS (Meyer and Steyn, 1992).

Life Skills training enhanced students' mental health, self-esteem, and assertiveness (Nejad, 2010). Influence of Life Skills modelling through literary connections on student academic success in English class was studied, and a deep critical link was apparent (Laleman, 2010). Problem-solving Life Skill was relevant to science and technology for secondary school students (Vashista & Bhardwaj, 2006). Learning mathematics was noted to develop Life Skills like problem-solving among middle-class students (Kumari, 2002). Further, it was remarked that for the development of Life Skills, different strategies like an after-school programme that utilized experiential and cooperative learning activities (Junge et al., 2006) and classroom-based social decision-making intervention (Elias & Kress, 2005) were required.

Sports and Life Skills intervention increased coping skills, athletic perceived performance, and general self-worth (Moffett, 2005). Motor coordination problems were reported to be reduced with the practice of Life Skills among schoolgirls with autism spectrum disorder and developmental coordination disorder (Kopp & Gillberg, 2010). Further, students with dyslexia reported favorable views of their Life Skills development self-efficacy in academic, personal, social, career, and talent development domains (Shea, 2011). Instructors of rural high school students with mental retardation reported the effectiveness of the personal-social skills curriculum for an extended period and with continuous reinforcement (Quigley, 2007).

Employee productivity was reported to be enhanced by Life Skills training that facilitated psychosocial skills (Maree & Ebersohn, 2000) and increased efficiency and quality of work (Lobner, 1997) and reduce problems at the workplace (Hartley, 2007). Life Skills training programme was related to higher self-efficacy (Shechtman, Levy & Leichtentritt, 2002)

The activity-oriented instruction was effective in Life Skills education than the conventional lecture method for secondary school students (Pereira & Krishnan, 2011). The use of music in teaching Life Skills to students with emotional disabilities was recommended (Emeka, 2009). Online teacher monitored instructions for Life Skills were suggested to enhance students' performance at the secondary level (Grover, 2006), systematic and formal teaching of Life Skills to the middle. Junior high school students were recommended for interpersonal relations and survival, and success (Hamburg, 1990). Jones, Brian, Airedale & Norma, 2006 suggested an enterprise mode of learning

for the flexible market economy and provision of resources for teaching Life Skills and sexual and reproductive health was promoted by Kalanda, 2010.

Open and distance learning mode was suggested to deliver a program on Life Skills to adolescents (Lineo & Kolosoa, 2009). A quality instruction model with home-based remediation was reported to enhance students' performance on Life Skills (Malhotra, 2006). Barnlund transactional model of communication was found to be effective in improving the Life Skills of students like critical thinking, decision making and communication skills (Meena, 2006); making Familiar Strange approach of Synectic model of teaching was reported to enhance the creative thinking ability of learners (Pany, 2008), child play-based programme was developed to nurture children's creative expression (Rowland, 2002), project-based learning was reported as successful to teach critical Life Skills to help students succeed in college and life in general (Scott & Jenifer, 2009; Zimmer, 2008) and films on the content of critical thinking skills were reported to improve knowledge of the content area (Weerts & Sally, 2005).

Life Skills training was indicated to decrease the onset of smoking behavior among students of the eighth, ninth and tenth grades due to increased ability to cope with direct pressure to smoke, anxiety, and decreased susceptibility to indirect pro-smoking social influences (Botvin & William, 1980). Reduced drug and alcohol use among ninth-grade students (Carmack, 2005) and student of the programme indicated an intention to stay smoke-free (Zollinger, Commings & Caine, 2003). Life Skills-based education was stated to have a reduced probability of young individuals engaging in interpersonal violence (Guera, 1994). Life Skills-based structured learning therapy reduced depression among students (Reed, 1994) and reduced peer-directed aggression among boys (Hudley & Graham, 1993), positively impacting decision making, problem-solving and conflict management (Magee, 1999).

Life Skills training programmes for college students improved self-concept and reduced depression and anxiety (Davis, 2004). Few studies suggested that Life Skills developed coping skills for anxiety and depression, interpersonal and cooperative skills (Shangold, 2004), and contextual variability in the transfer of problem-solving skills to increase the likelihood of accurately solving transfer problems and recognizing principles in novel problems (West, 2003). The study of Life Skills on teacher education programmes was suggested to facilitate learning, manage class, generate a resource, and assess (Louis, 2008). Parental responsiveness was indicated to predict Life Skills development in older adolescents (Slicker et al., 2007).

Social skills training programme was found to be effective on behavior problems of a child (Misner, 1995), to develop interpersonal behaviors and skills for adolescents (Chaudhari, Vaidya and Mahapatra, 2007). The awareness training model of life science was adequate to create creativity and academic Achievement (Christane, 2008). Study skills training for standard eight students was found to positively impact their achievement in biology (Gafoor and Shemi, 2007). Guidelines to develop skills for adolescents to encourage positive choices was designed by Halter and Lang (1994)

There are many studies related to life skill education. These studies implied that a well-developed strategy could encourage students in their social, physical and emotional issues. Many studies emphasized the introduction of life skill education in schools. In the workshop organized by UNESCO on life skill education in 1998, it was discussed that life skills should not be taught in isolation but should be mingled with schooling. The objective of the workshop organized by the Department of Adult and Continuing Education at the University of Madras in 2006 is to integrate life skill education into the curriculum at the college level.

There were many studies such as Kwatra (2000); Amin (2011); Bryan et al. (2011); Nimavathi & Gnanadevan (2012); Mohammadpour (2012); Parekh (2012); Myrten (2013); Shamsudin et al. (2013); Pillai (2013); Mehta & Kulshrestha, (2014); Ahmad & Rai (2015); Katsampoxaki, & Fouskaki, et al. (2015); Kumari (2002); Kurbah (2015), which proved that integration of different teaching-learning approaches with science and technology subject results in better understanding of the subject. It was reviewed in some studies (Kumari, 2002; Kwatra, 2000; Eisha & Khirwadkar, 2017). Different life skills such as creativity, problem-solving skills could be enhanced through selected topics of science subjects. But the researcher could not find any study that tried to develop all ten (specified by the CBSE life skill manual) life skills through science and technology subjects.

From the review of related studies, it was found that previously in life skill education, more focus was given on the health of adolescents. Still, in recent years, the need to introduce life skill education in the school curriculum was felt, and more studies were carried out at the school level to present it in the curriculum. But now, there is a strong need of integrating life skill education with a subject for effective delivery of content and understanding of content in students' Day to day life situations. All the above studies show that life skill education played a significant role in enhancing students' and teachers' behavior, which improves the overall development of students, which is the goal of

education. But the investigator did not come across any study related to the integration of life skill education and science subject not even in any other issue in India or Abroad. As for as the present study is concerned, the investigator from experiences and the light of discussions with learned people was convinced that enhancing practical Life Skill Education is needed to be studied.

15. Research Design

The proposed study is experimental in nature. The pre-test and post-test controlled non-equivalent group design was followed in this research. The design of the study is presented as follows:

O1 X O2

O3 C O4

Where, O1 and O3 are pre-test, O2 and O4 are post-test, X stands for Experimental Group and C stands for Control Group.

Researcher took one control and one experimental group as intact classes. This design is one of the most effective in minimizing the threats to experimental validity and extraneous variables. Most of the threats like history and maturation were controlled by taking control group. Effect of testing was minimized by taking post-test parallel to the pre-test. The tools were validated by experts so the threat to unstable instrument was taken care of.

16. Sample

The sample of the study was selected purposively. Two secondary schools, both affiliated to CBSE in Vadodara city, were selected purposively. The selected schools have all the infrastructural facilities (smartboards linked with computers and well equipped science labs), important for the implementation of the programme and also the school readily consented to provide those facilities to the researcher for the effective implementation of the programme. 40 Students of class IX of one school were selected for experimental group and 40 students of class IX of other school were considered as control group. Students of experimental group were taught in the academic year 2015-16 for one semester by the researcher, integrating science and technology subject through life skill based activities while control group was taught by their teacher in a traditional method.

17.Variables in the Study

17.1 Independent Variables

Developed program in the form of life skill-based activities, considered as one of the independent variables, was implemented in the experimental group to analyse its effect on the achievement in content knowledge of the concepts taught (topics of science and technology subject) and life skills. Another independent variable was conventional or standard classroom teaching, which was taken care of as a control group.

17.2 Dependent variable

For the present study, the dependent variable includes achievement in content knowledge of the concepts taught (topics of science and technology subject) and life skills.

18. Different Phases of the Research Design

18.1 Phase I: Development of the Program and Tools

18.1.1 Development of Program

Before developing the program, the NCERT book of Science and Technology subject for IX standard was thoroughly analysed by the researcher and discussed with the guide and science teachers of IX standard to find the most appropriate topics for the study. It helped the researcher understand the content competencies and provided the idea to develop life skills among students through the concepts of science and technology subject. After detailed scrutiny, the researcher selected fifteen topics from the first term course syllabus for developing the program. The topics were set based on specific criteria related to daily life; possible life skill-based activities could be designed and integrated with life skill education. The selected subjects were cell, cell organelle, Tissue, animal tissue, Mixture, separation of Mixture, types of tissues, water, evaporation, life history of Newton, conservation of energy, states of matter, crop production, crop variety. After determining and evaluating selected topics, activities were developed on the issues chosen by the researcher. The developed activities were grounded on content (selected topic) knowledge and helped build life skills among students.

18.1.2 Development of Tools

The researcher prepared different tools for data collection to evaluate the effectiveness of the developed program. All the developed tools were detailed as under:

Pre- and post-achievement test: The test was constructed by the investigator. Experts validated it. To achieve the objectives of the present study, a test comprised of multiple short answer questions was prepared and validated by the subject experts. Achievement

test was based on subject and administered on experimental as well as control groups. The test has situation based questions related to the topics from the science and technology subject covered under the study (such as cell, tissue, force, cell organelles).

Worksheets: Five Worksheets based on different activities were prepared by the Researcher for appraising Life skills. These worksheets were assessed using a checklist given by CBSE in Chapter IV of Teacher's Manual on Continuous and Comprehensive Evaluation, classes IX-X for assessing Life Skills, along with the help of field notes.

Field Notes: Record of the activities were maintained in the form of field notes. Field notes also include students' reviews, specific observations, and their behaviour during and after each activity.

Checklists: Checklists framed by the researcher were based on the checklist given in Chapter 4 of CCE Manual By CBSE. Further, CBSE has clustered the ten core Life Skills into three major Skills: Thinking, Emotional, and Social skills and highlighted different indicators to assess these Life Skills. These checklists are further graded based on a five-point grading scale as given in the Chapter 4 of CCE Manual By CBSE.

The grading scale includes A*, A, B, C, and D.

Grading Scale: The five-point grading scale is given below

Most indicators in a skill A*

Many indicators in skill A

Some indicators in skill B

Few indicators in skill C

Very few indicators in skill D

These grades were given by using descriptive indicators used in the checklist of all the life skills reflected by the students in the worksheets and during the class.

Opinionnaire: It was prepared to understand the opinion of the students towards the life skill-based activities (Developed Program) in science and technology subject. The opinionnaire includes open-ended questions seeking students' suggestions and their opinion towards the developed program.

18.2 Phase II: Implementation of the Program

Developed programme which includes various activities, was implemented in the class room. Investigator took first semester course of science subject of 9^{th} standard in the session of 2015-16, to administer the programme. In experimental group, programme was administered and control group was taken care by traditional method by their regular

teachers. Investigator administered the developed programme in first half of the academic session in 2015 as the developed programme includes topics of first semester course of IX standard. As the researcher's purpose was to study the development of life skills (if taught through science subject) only the selected topics were taught by the investigator through developed activities (developed programme) and remaining syllabus of the first term was taken care by class teacher.

18.3 Phase III: Data Collection

18.3.1 Administration of Pre-test

Investigator implemented the pre-test in both experimental and control groups. The pre-test was implemented before implementing the developed program in the experimental group and at the same time in the control group. The pre-test was administered at the start of the session in March 2015.

18.3.2 Administration of Worksheet / Field Notes

Notes were maintained by the researcher to record students' reviews, specific observations, and their participation and behaviour throughout each activity and also during discussion. Worksheets were implemented by the researcher after some of the activities to assess improvement in life skills.

18.3.3 Administration of the post-test

Investigator administered post-test on both control and experimental groups after the implementation of the program. At the end of the first-semester course in August 2015, the post-test was administrated by the investigator on both the control and experimental group.

18.3.4 Administration of the opinionnaire

Opinionnaire was implemented to know the opinion of the students of the experimental group about the developed program. The opinionnaire includes thirteen open-ended questions framed with a viewpoint to seek students' reactions about the developed program.

19.Data Analysis

Data analysis includes analysis of complete data cumulated by the Researcher through different means to study the effectiveness of the developed program in terms of achievement in science and technology subject as well as improvement in life skills

Since the collected data were quantitative as well as qualitative in nature, analysis of the collected data was done using different data analysis techniques. Non-parametric statistics were applied for quantitative data analysis. Wilcoxon Rank Test and Mann Whitney U test were applied to measure the influence of the intervention.

Qualitative responses collected from the opinionnaire were analysed through quantitative content analysis. Quantitative content analysis was done by coding the set of data provided in the opinionnaire and analysing it through frequency count and percentage.

20.Major Findings

Significant findings of the present study are:

1. The first objective of this research was to develop Life skill-based activities on the topics of science and technology subject of IX standard. Fifteen topics from the science and technology NCERT book of IX class were selected. The program was developed considering the needs and demands of the students and the experiment. The expanded program includes activities based on the concept of knowledge integrated with life skill education to fulfil the requests of both subjects. The program consists of indoor and outdoor activities along with one field trip.
2. Drafting an activity-based program with an integrated approach (life skill education merged with science concepts) evidenced the verity that it is possible to outline content knowledge of any academic subject through life skill-based activities.
3. The developed program, which includes various Life skill-based activities, was implemented during the science period. The total time entailed during the experiment was almost 1,770 minutes, consisting of pre-test and post-test durations, excluding fieldwork timings.
4. During the implementation of the program, it was observed by the researcher that most of the students were enthusiastic for every next task and actively participated in most of the activities. Initially, few students felt shy and apprehensive while taking part in the training and were hesitant to introduce themselves voluntarily for the action. Later, after two moves, students found interest in the activities and felt confident while performing any responsibility during the task.

5. The Mean achievement scores of the group taught through the program was 54.53, which was much higher than the mean achievement scores of the group (26.48) taught traditionally. The calculated U value was 0, and the Z value was 7.69, which was significant at 0.01 level of significance, which strongly validates the program's effectiveness concerning achievement in science and technology subjects. It could be concluded that students of the experimental group developed a better understanding of the science concepts after implementing the program.
6. On comparing mean achievement scores of pre-test (which was calculated as 22.175) with the scores of the post-test (calculated as 49.725) of the experimental group, it can be extrapolated that at the end of the experiment, students developed more clarity in science concepts taught through the life skill-based activities.
7. Similarly, a comparison of mean achievement scores of pre-test (20.35) and post-test (22.375) of the control group reveals that students taught through the traditional method didn't exhibit much improvement.
8. The results indicated an upward trend in the number of students under grade A with every progressive worksheet.
9. Similarly, there was a noticeable downward trend in the count of students under grades B, C, and D.
10. The findings revealed favourable responses from the students towards the developed program. According to them, the activities carried out during the program were meaningful and helpful in developing the science concepts.
11. Life skill education integrated with science topics helped students develop different skills necessary in life, such as communication, coping with stress, managing emotions, and interpersonal skills.
12. The activities proved to be an effective remedy for the students to understand the concept of science by observing, analyzing, and inferring the conclusion themselves. In other words, the use of different activities helps students understand and comprehend the idea more effectively and improve their life skills.
13. Students felt the teaching-learning process adopted during the program made concepts easier to grasp.
14. 95% of the students opined that learning through activities was an entertaining and delightful experience. According to them, Such activities help in developing a concentration in uninteresting topics also, as during any activity most of the students were engaged in one or another task.

15. When asked about adequacy concerning the number of activities taken under different topics, 40% responded with a favourable response.
16. More than 50% of the students marked all the activities as exciting and enjoyable.
17. 75% of the students believe that a better understanding of science concepts could also help develop most life skills.
18. Most of the students responded, a better understanding of the concepts and relating science concepts with daily life situations, in response to the question, "What changes do you perceive in yourself after the program in terms of your understanding of science concepts?"
19. A remarkable number of students commented that the program helped create interest in boring topics, developed an interpersonal relationship while knowing each other during the activities, developed teamwork and team management, enhanced communication skills, developed inquiry skills, creativity, and thinking skills.
20. More than 80% of the students thought that both the subjects (Science and life skill education) could be proved as helping hand to each other for the better understanding of one another.

21. Implications of the Study

The study aimed to analyze the effectiveness of the integrated approach on both the subjects, i.e. science and technology, and life skill education. The findings of the survey highlighted the success of this practice of teaching-learning. In general, the results reflect the program's effectiveness, as students taught through life skill-based activities were statistically leading in achievement in science and technology subjects and outstanding in life skill performance, compared with students taught through the traditional skills method. Favourable responses from the students about the program suggested that the activities triggered interest and curiosity and developed life skills among experimental group students. Considering the importance of the study in the field of both science and technology and life skill education, as well as, findings of the study, the following implications can be drawn from the survey:

1. Life skill-based activities integrated with science and technology subjects help students develop life skills and content knowledge of the topic.
2. In addition, the program guided students to understand any issue or topic from different perspectives by analyzing the pros and cons of that topic.

3. Students develop the skill of self-analysis, self-learning, and appreciating others' perspectives through teamwork.
4. Students apply concepts taught in the schools by relating those concepts of the regular curriculum with daily life situations, which eventually develop their understanding and curiosity for the subject.
5. Furthermore, such programs guide students to think critically and creatively, behave responsibly and confidently, use decision-making and problem-solving skills while facing life challenges.
6. The program will help and guide teachers while preparing such integrated approaches at any level of the teaching-learning process, even for specific learners.
7. It could be of utmost importance for the teachers and curriculum developers to prepare quality and need-based pedagogy for an effective teaching-learning process.
8. The researcher has integrated activities with the science subject, but it could be blended with any issues to make the content more exciting and skilful.
9. Such a program will also help teachers deal with the students' behavioural issues in a regular class.
10. The interactive strategies used by the researcher during and after the implementation of the activity can be used by the teacher to make the class more lively and arouse interest and curiosity among students.
11. The study authenticated that, if given a conducive and advantageous classroom environment to the students, any subject or topic could be made exciting and learnable.

22. Suggestions for Further Study

As reported by the number of research work and many commissions, the status of science education does not need any debate. Similarly, life skill education in India is still surviving in darkness. The present study, as an integrated approach, was an initiative in this direction. The focus of the current work was to develop an integrated and activity-based program, implement that program and study its effectiveness in terms of achievement in science and technology subjects along with improvement in life skills among students. The review of literature and experiences gained during the study helped the researcher comprehend different perspectives that need further research and analysis. These were:

1. The researcher took science as a second subject for blending with life skills. A study may be taken up considering other issues also.
2. Preparing modules on concepts of different subjects relating to real-life situations and how to deal with those situations can be considered as an exciting study.
3. The researcher took the second stage for the experiment; a Similar Study may be undertaken at other education locations.
4. The researcher studied all the ten core life skills during the experiment. Considering single life skill can be further researched more profoundly, and its relationship with other skills or its relationship with science concepts can be taken up as a study.
5. The present study considered a few topics of science and technology; the complete syllabus may also be taken up for further research.
6. Further, the researcher took CBSE board students as a sample; more studies can be conducted at the state, national or international boards, and even at the college and university levels.
7. Going a step further, a study can be undertaken to survey the effect of such programs on the students while selecting a stream of education at the higher secondary level or the college level.
8. The role of parents in encouraging children to participate in subject-based life skill programs can also be studied.
9. A study can also be conducted to analyze the effect of subject-based life skill programs on children with special needs learning.
10. A critical study on the integration of life skill education in the regular school curriculum of CBSE schools can also be studied.

23. Conclusion

National Curriculum Framework (NCF, 2005) pointed out the importance of science education at secondary age by stating that at this age, students should be prepared to learn science as an integrated discipline with more advanced tools of learning, in particular, advanced technological modules and composite pedagogy. Further, the report also mentioned life skills as a necessity to meet the demands and challenges of everyday life. Like this, life skill education and science and technology are of utmost priority in the contemporary period. They were such a significant subject, in this day and age much-debated also. Notwithstanding that, the status of both the issues is yet abysmal. The integration of both the themes uplifted the inadequacies of each other and resulted in a

positive outcome. Kumari (2002) and Grover (2006) related life skill education with mathematics and science education and found satisfactory results.

In the present study, the researcher attempted to develop an activity-based program to enhance life skills and create a conceptual understanding of science and technology subjects among IX standard students of CBSE school. Different activities were framed on selected topics, keeping in view the learning needs of the students. The findings revealed that students were in favour of such classroom teaching-learning approaches. Learning outcomes in terms of achievement in science and technology subjects were also noteworthy.

To conclude, it could be stated that life skill-based activities, if applied in a regular classroom, could convincingly improve the teaching-learning process and yield desired results. Such efforts will produce a worthwhile and competitive generation who will behave responsibly, consider better and informed choices, and mark their presence in the development of society and the country.

BIBLIOGRAPHY

Adolescences Education Programme: Teachers' workbook. Retrieved, from http://TEACHERS%20BOOK%201-50.pdf

Anderson, S. W., & Moore, P. A. (2009). The impact of education and school-based counseling on children's and adolescents' views of substance abuse. *Journal of Child and Adolescent Substance Abuse*, *18*(1), 16–23. https://doi.org/10.1080/15470650802526526

Bender, G. C., & Lombard, A. (2004). Personal and interpersonal effects of a life skills Programme on grade 7 learners. *Social Work*, *40*(1). https://doi.org/10.15270/40-1-354

Best, J.W. & Kahn, J.V. (1992). Research in education, (sixth Ed.) New Delhi. Prentice-Hall of India Private Limited.

Botvin, G.J., Baker, E., Botvin, E.M.. Filazzola, A.D. and Millman, R.B. (1984). Alcohol abuse prevention through the development of personal and social competence: A pilot study. Journal of Studies on Alcohol, 45, 550-552.

Botvin, G.J. & Griffin, K.W. (2012). Long-term outcomes from Blueprints model programmes: Life Skills Training. Presented at 2012 Blueprints for Violence Prevention conference. San Antonio, TX.

Botvin, G. J., Eng, A., & Williams, C. L. (1980). Preventing the onset of cigarette smoking through life skills training. *Preventive medicine*, *9*(1), 135-143.

Botvin, G. J., Griffin, K. W., Paul, E., & Macaulay, A. P. (2003). Preventing Tobacco and Alcohol Use among Elementary School Students Through Life Skills Training. Journal of Child and Adolescent Substance Abuse, 12(4), 1–17. https://doi.org/10.1300/J029v12n04_01

Botvin, G. J., Schinke, S. P., Epstein, J. A., Diaz, T., & Botvin, E. M. (1995). Effectiveness of culturally focused and generic skills training approaches to alcohol and drug abuse prevention among minority adolescents: two-year follow-up results. Psychology of Addictive Behaviors, 9(3), 183.

Buhs (2000). Programme Evaluation of the American Indian Life Skills Development Curriculum with American Indian and Caucasian adolescents. Retrieved from http://shodhganga.inflibnet.ac.in

Caplan, M., Weissberg, R. P., Grober, J. S., Sivo, P. J., Grady, K., & Jacoby, C. (1992). Social competence promotion with inner-city and suburban young adolescents: Effects on social adjustment and alcohol use. *Journal of Consulting and Clinical Psychology*, *60*(1), 56-63. http://dx.doi.org/10.1037/0022-006X.60.1.56

Carmack, C. C. (2005). Decreasing drug and alcohol use: *The life skills curriculum at john dickinson high school* (Order No. 3187607). Available from ProQuest Dissertations & Theses Global. (304992702). Retrieved from https://search.proquest.com/docview/304992702?accountid=144497

Central Board of School Education (2009). Teachers' Manual on Continuous and Comprehensive Evaluation classes IX-X, New Delhi. Retrieved from http://www.cbse.nic.in/cce/cce-manual/initial_pages.pdf

Central Board of School Education (2010). Teachers' Manual on Life Skills classes IX-X, New Delhi. Retrieved, from www.cbse.nic.in/cce/life_skills_cce.pdf

Chatterjee, S. (2000). Advanced Educational Psychology. Calcutta. Books and Allied (P) Ltd

Chaudhari, U. S., Vaidya, S. & Mahapatra, K. (2007). An examination of school anxiety, social skills, social adjustment, and self-construal in urban and rural students through various models of teaching. Retrieved from http://www.support 41eaming.org.uk/education/research_skills_.df

Choudhari, V.S., Vaidya ., Navalakha, N.G. & Mahapatra B.C., (1998). Effect of teaching strategies and socioeconomic status on self-concept of the learner. *Indian Psy. Rew*, *50*(4):216-223.

Christane, S. (2008). Impact of awareness training model of teaching in life science to develop creativity among pupils. Journal of Higher Studies, Vol. 20, Sep. & Dec. 2008. No's. 3 & 4, p. 166-197

Creswell, J. W. (2014). *Research Design*. In SAGE Publications (4th ed.). https://doi.org/10.1063/1.1150549

Davis (2004). Impact of Stress Reduction Interventions on Hostility and Ambulatory Systolic Blood Pressure in African American Adolescents. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3319013/

Dogra, A., & Veeraraghavan, V. (1994). A study of psychological intervention of children with aggressive conduct disorder. *Indian Journal of Clinical Psychology*, *21*(1), 28-32.

Economic and Social Research Council (2006). Science education in schools: Issues, evidence and proposals, UK. Retrieved from www.tlrp.org/pub/.../TLRP_Science_Commentary_FINAL.pdf

Elias, M. J., Gara, M. A., Schuyler, T. F., Branden-Muller, L. R., & Sayette, M. A. (1991). The promotion of social competence: Longitudinal study of a preventive school-based programme. *American Journal of Orthopsychiatry*, *61*(3), 409–417. https://doi.org/10.1037/h0079277

Elias, M. J., & Kress, J. S. (1994). Social Decision-Making and Life Skills Development: A Critical Thinking Approach to Health Promotion in the Middle School. Journal of School Health, 64(2), 62–66. https://doi.org/10.1111/j.1746-1561.1994.tb06180.x

Elias, M. J., & Kress, J. S.(2005). Social decision-making and life skills development: A critical thinking approach to health promotion in the middle school. Technical Education & Training Abstracts, Journal of School Health, 64,(2),62- 66.

Emeka, W. (2009). The use of music to teach life skills to students with emotional disabilities in the classroom. US-China Education Review, Vol. 7, No. 1, p. 17-26

Gafoor, A. K., & Shemi, C. (2007). Impact of study skills training on achievement in biology of standard VIII students. Journal of All India Association for Educational Research, 19(3 & 4), 45–48.

Gamble, B. (2006). Teaching Life Skills for Student Success. *Techniques: Connecting Education & Careers*, *81*(6), 40–41. Retrieved from https://eric.ed.gov/?id=EJ751442

Green, R.H. (1988). Ghana: Progress, Problematics and Limitations of the Success Story, *IDS Bulletin 19*(1): 7-16.

Grover, J. (2006). Impact of teacher monitored on line instructional programme on various life skills and academic stress of secondary schools students. Retrieved from ir.inflibnet.ac.in

Gujarat Council for Education Research and Training (2011). Annual Report 2010-11, Gandhinagar. Retrieved from gcert.gujarat.gov.in/gcert/Images/Annual_Report_2010-11.pdf

Halter, M. H. & Lang, B. F. (1994). Making choices: Life skills for adolescents. Dissertation Abstracts International, Nov. 1994, Vol. 54, No. 9, p. 2733.

Hamburg, D. A., & Takanishi, R. (1989). Preparing for Life: The Critical Transition of Adolescence. *American Psychologist, 44*(5), 825–827. Retrieved from https://doi.org/10.1037/0003-066X.44.5.825

Hartley, M. (2007). Staying on the employer spreadsheet. *Journal of Employee Assistance, 37*(2).

Helaiya S. (2010). Development and Implmentation of a Life Skills Programme for Student Teachers. An unpublished Ph.D. Thesis. Vadodara: CASE The M.S. University of Baroda.

Hudley, C., & Graham, S. (1993). An Attributional Intervention to Reduce Peer-directed Aggression among African-American Boys. *Child Development, 64*(1), 124–138. https://doi.org/10.1111/j.1467-8624.1993.tb02899.x

Jones, B., & Iredale, N. (2006). Developing an entrepreneurial life skills summer school. *Innovations in Education and Teaching International, 43*(3), 233–244. https://doi.org/10.1080/14703290600618522

Junge, S. K., Manglallan, S., & Raskauskas, J.(2006). Building life skills through afterschool participation in experiential and cooperative learning. Child Development Abstracts Child Study Journal, 33 ,165 – 174.

Kalanda, B. F. (2010). Life skills and reproductive health education changes behaviour in students and teachers: Evidence from Malawi. *Educational Research and Reviews, 5*(4), 169–174. Retrieved from https://eric.ed.gov/?id=EJ887335

Kirar Meenu (2012). Building Life Skills through Adult Education for Quality of Life: A Research Study on Adult literates in Ajmer District of Rajasthan. Indian Journal of Life Skills Education. Volume 3 Number 2 Jan 2012.

Kopp, S., Beckung, E., & Gillberg, C. (2010). Developmental coordination disorder and other motor control problems in girls with autism spectrum disorder and/or attention-deficit/hyperactivity disorder. *Research in Developmental Disabilities, 31*(2), 350–361. https://doi.org/10.1016/j.ridd.2009.09.017

Kumari, S. (2002). On Linking Mathematics Education with Life Skills. *Journal of Indian Education, 28*(1), 69- 76.

Laleman, J. (2010). *How Does Life Skills Modeling Through Literary Connections Create a Higher Level of Academic Success in English Students?* (.Southwest Minnesota State University). Retrieved from https://search.proquest.com/docview/519150564?pq-origsite=gscholar

Le Metais, J., & Jordan, D. (1997). Emotional Intelligence and Student Behaviour, 1 (2). *IEJLL: International Electronic Journal for Leadership in Learning, 1*.

Lickona, T. (1997). THE TEACHER'S ROLE IN CHARACTER EDUCATION. *The Journal of Education, 179*(2), 63-80. Retrieved from http://www.jstor.org/stable/42741723

Life Skills Training Guide for Young People: HIV/AIDS and Substance Use Prevention. United Nations, New York (2003). Retrieved from http://www.unodc.org/pdf/youthnet/action/.../escap_peers_00.pdf

Lineo, K. (2009). Life Skills of adolescents for National development regardless of their diversity in culture, economic conditions and social and political structures.

Lobner, S. (1997). *Life skills for the world of work: experiences in South Africa.* Geneva: Training Policies and Systems Branch International Labour Office.

Louis, M. C. (2011). Strengths interventions in higher education: The effect of identification versus development approaches on implicit self-theory. Journal of Positive Psychology, 6(3), 204–215. https://doi.org/10.1080/17439760.2011.570366

Louis, V.(2008). Teacher education curriculum: Perspectives. New Frontiers in Education, 41, (4), 403-407.

Magee, C. A. (1999). The peaceleaders: a descriptive study of the life skills gained through conflict-resolution training (Doctoral dissertation, University of La Verne).

Malhotra, A. (2006). College and cultural diversity: A global language arts perspective. Retrieved from https://search.proquest.com/docview/304909202?pq-origsite=gscholar

Maree, K., & Ebersöhn, L. (Liesel). (2002). Lifeskills and career counselling. Retrieved from https://www.worldcat.org/title/lifeskills-and-career-counselling/oclc/50775096

Meena, M. (2006). Impact of barnlund transactional model of communication on life skills of secondary school children in relation to their learning approaches.

Meyer-Weitz, A., & Steyn, M. (1992). AIDS Preventive Education and Life Skills Training Programme for Secondary Schools: Development and Evaluation. Retrieved from https://eric.ed.gov/?id=ED407372

Misner , D.B.(1995). An evaluation of a secondary prevention social skills training Programme for children. *Dissertation abstracts international, 55*(12).

Mize, J. & Ladd, G. (1990). A cognitive-social learning approach to social skill training with low-status preschool children. Developmental Psychology, 26, 388-397.

Moffett, A. C. (2005). Paving the road to success: Using sport to teach life skills to children who have physical disabilities. Michigan State University.

Nair, M.K.C. (2005). Family Life Skills and Life Skills Education for Adolescents: Trivandrum Experience. Journal of Indian Adolescence for child and Adolescence Mental Health.

Nava, M. E. (1998). The self-perception of personal skills between traditional versus nontraditional college students.

NCERT. (2001). Guidelines and syllabus for secondary stage. In Sharma, R C (2006). Modern Science Teaching. New Delhi: Dhanpat rai publishing comp.

NCERT. (2005) National Curriculum Framework for School Education: NCF-2005. New Delhi: NCERT

Nejad, S. Y. M. Y. (2010). The impact of life skills training on self esteem, mental health and assertiveness: a study among students of Boosher s High Schools in Iran.

Obiozor, W. E. (2010). The Use of Music to Teach Life Skills to Students with Emotional Disabilities in the Classroom. Online Submission, 7(1), 17–26.

Pany, S. (2008). Effectiveness of Synectics Model of teaching in enhancing creativity, academic achievement and achievement motivation of learners. *EJAIAER, 20*, 63-65.

Parsons., C., Hunter. D. & Waimey. (1988). Skills for Adolescence : An analysis of project material training and implementation. Christ Church College, Evaluation Unit, Canterbury, U.K.

Patel, R. (2010). Development of an instructional strategy for primary school teachers to teach creative and critical thinking skill. An unpublished Ph.D. Thesis. Vadodara: CASE. The M.S. University of Baroda.

Paul, R. Amato., Gay, Ochiltree. (1990). Children becoming independent: An investigation of children's performance of practical life-skills. *Australian Journal of Psychology*, *38*(1) , 59 – 68.

Pereira and Krishnan (2011). Life Skills of secondary school students in Kerala. Unpublished Doctoral Dissertation. M.G.University, Kottayam.

Piaget .J. (1951) Play Dreams and Imitation in Children, London, Heinemann, Ltd.

Piaget, J. (1972). Intellectual evolution from adolescence to adulthood. Human development, 15: 1-12.

Quigley, M. K. (2007). The effects of life skills instruction on the personal-social skills scores of rural high school students with mental retardation.

Reed, M. K. (1994). Social skills training to reduce depression in adolescents. *Adolescence*, *29*(114), 293–302. Retrieved from https://go.galegroup.com/ps/anonymous?id=GALE%7CA15622125&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=00018449&p=AONE&sw=w

Rowland, G. E. (2003). Every child needs self-esteem: Creative drama builds self-confidence through self-expression.

Rychaen, H. K. & Salganik, Y. (2001). The new dynamics of life skills coaching. Toronto: YWCA of Greater Toronto

Shah, S. H. (1992) A study of effectiveness of educational programmes for developing skills of thinking. In Mishra R.C. (Ed.) Fifth Survey of Educational Research, New Delhi: NCERT

Shangold, H. R. (2004) Life skills training programme for youth of high schools of Mississippi, Dissertation Abstracts, *International*, *64* (4), 1916.

Shea, P. (2011). Life Skills Development in Junior Secondary Studentsfrom Hong Kong with Specific Learning Difficulties (Doctoral dissertation, Alliant International University).

Shechtman, Z., Levy, M., & Leichtentritt, J. (2005). Impact of Life Skills Training on Teachers' Perceived Environment and Self-Efficacy. Journal of Educational Research, 98(3), 144–155. https://doi.org/10.3200/JOER.98.3.144-155

Slicker, E.K., Picklesimer, B. K., Guzak, A. K., & Fuller , D. K. (2005). The relationship of parenting style to older adolescents' life-skills development in the United States. *Young August*, 13(3): 227–245

Slicker, E.K., Picklesimer, B. K., Guzak, A. K., & Fuller , D. K.(2007). The relationship of parenting style to older adolescent life-skills development in the United States. Child Development Abstracts. 13, (3) , 227 – 246.

Srikala, B. and Kishore, K. V., 2005, Activity manual for the teachers on health promotion using life skills approach, NIMHANS, Bangalore - 29, India.

Srikala, B. and Kishore, K. V., 2012, Empowering adolescents with life skills education in schools- School mental health programme: Does it work?. Indian J. Psychiatry, 52 (4): 344-349.

Stage 6 Science Life Skills Course (2007). New South Wales, Australia. Retrieved from www.boardofstudies.nsw.edu.au

Sharma, S. (2003). Measuring life skills of adolescents in a secondary school of Kathmandu: an experience. Kathmandu University Medical Journal, Vol. 1, No. 3, Issue 3, 170-176.

Suresh S. (2012). Social Skills and Well-being among College Students. Indian Journal of Life Skills Education. Volume 3 Number 2 Jan 2012.

Taremian F (1999) Drug abuse in adolescents. I ed. Tarbiat Publ., Tehran. pp:89

Taremian, F. (1999). Life skills training. Iranian Journal of Clinical Psychology , 21,181-195.

The Department of Adult and Continuing Education, (Feb. 17, 2006). International Workshop on life skills Education for Youth Development in at the University of Madras. The Hindu.

Thomas, L. (1991). Educating for character: How our schools can teach respect and responsibility. Bantam Books.

Thurston, L. P. (2002). Practical Partnerships: Analysis and Results of a Cooperative Life Skills Programme for At-Risk Rural Youth. *Journal of Education for Students Placed at Risk (JESPAR), 7*(3), 313–326. https://doi.org/10.1207/s15327671espr0703_2

Tobler, N. S. (1992). Drug Prevention Programmes Can Work: *Journal of Addictive Diseases*, *11*(3), 1–28. https://doi.org/10.1300/J069v11n03_01

Tolan, P., & Guerra, N. (1994). What works in reducing adolescent violence. An empirical review of the field boulde.-CO: Center for the Study and Prevention of Violence.

Umasree, P.S. (1999). The study of problems faced by teachers in teaching science and technology at secondary schools of Vadodara city. An unpublished Ph.D. Thesis. Vadodara: CASE. The M.S. University of Baroda.

UNICEF. (2003). Definition of terms | life skills | UNICEF. Retrieved from https://www.unicef.org/lifeskills/ index_7308.html

UNICEF. (2005). Life skills : a facilitators guide for teenagers. UNICEF.

UNICEF (2006) "Life Skills Modules -Adolescence Education Programme". New Delhi: UNICEF House.

UNICEF. (2011) . The state of the world's children 2011. New York: UNICEF

UNICEF (2012). Global Evaluation of Life Skills Education Programmes. New York. Retrieved from www.unicef.org/evaluation/.../GLSE_Phase_2_Final_report_March_2012_ revised.pdf

Vashista, K., & Bhardwaj, S. (2006). The life skills relevant to science and technology as per the preference of boys and girls of secondary school.

Waltemire, M. E. (1999). A Kaleidoscope of Opportunity: Teaching Life Skills. *Camping Magazine*, *72*(1), 28-31.

Weerts, & Sally (2005). Use of films to teach critical thinking. *Journal of Nutrition Education and Behavior*, *37*(2), 100–101. https://doi.org/10.1016/S1499-4046(06)60025-0

West, R. (2003). Contextual variability in the transfer of problem solving skills. http://shodhganga.inflibnet.ac.in/

WHO .(1994) . Life skills education for children and adolescents in schools. Geneva:WHO.

WHO/GPA (1994). School Health Education to Prevent AIDS and STD: A Resource Package for Curriculum Planners. World Health Organization/Global Programme on AIDS, Geneva. Retrieved from www.who.int/mental_health/media/en/30.pdf

WHO. (1997). Life skill Education in Schools. WHO: Geneva.

WHO.(1999). Partners in Life skills Education: Conclusions from a United Nations inter agency meeting. Geneva:WHO.

World Health Organization (1994). The development and dissemination of life skills education: An overview. Geneva: Division of Mental Health, World Health Organization. Retrieved from www.who.int/mental_health/media/en/30.pdf

Wurdinger, S., & Rudolph, J. (2009). A different type of success: Teaching important life skills through project based learning. *Improving Schools*, *12*(2), 115–129. https://doi.org/10.1177/1365480209105576

Yankey, T. (2011). Impact of life skills training on psycho-social parameters: a study of Tibetan Refuge adolescents studying in India. An unpublished Ph.D. thesis, Vadodara: CASE, The M.S. University of Baroda.

Zimmer, D. (2008). Project based learning for life skill building in 12th Grade social studies classrooms: A case study. Dissertation Abstracts International, Vol. 68, No. 5, p. 1265A

Zimmerman, D. (2010). Project Based Learning for Life Skill Building in 12th Grade Social Studies Classrooms: A Case Study. *Online Submission*. Retrieved from https://eric.ed.gov/?id=ED510590

Zollinger, T.W., Commings, S.F., & Caine, V. (2006), Impact of the Life Skills Training curriculum on middle school students tobacco use in Marion Country, Indiana, Retrieved from www.indianresearchjournals.com.pdf/ISSSIR/2012/Nov/12.pdf,

Zollinger, T. W., Saywell Jr, R. M., Muegge, C. M., Wooldridge, J. S., Cummings, S. F., & Caine, V. A. (2003). Impact of the life skills training curriculum on middle school students tobacco use in Marion County, Indiana, 1997–2000. *Journal of School Health*, *73*(9), 338-346.