CHAPTER V

SUMMARY AND CONCLUSION

5.0.0 INTRODUCTION

As food is essential for physical development, in the same way education is essential for social development of each and every one in this world. Education is the nurturing force of human civilization. Good education is good to society and it creates an atmosphere of harmonious coexistence of all stake holders in the society. After globalization, ICT revolution followed by digital penetration in every walk of life, has surmounted enormous pressure in the system of education right from primary level education to tertiary education. Today's education expects a lot from school, particularly from teacher as he is the pivot of the life of every learner. Success of leaner is directly proportional to success of school education in turn success of teachers. The domain of learner is ever expanding with passage of time. Education must prepare our students to keep pace with changing times. At this juncture, Jhang (2007) statement seems pertinent (i.e We live in an interdependent and ever changing age in which the development of knowledge, information, science, and technology is constantly accelerating).Therefore, students must be guided in such a way that they can able to harness the potentials of self with the help of Science & Technology which demands a new approach in teaching science. Famous novelist of our time Paulo Coelho says '*People never learn anything by being told, they have to find out for themselves'* which indicates active way of learning science. In a same way Saha (2013) said 'students learn in variety of ways like by seeing and hearing, working alone and in groups, reasoning logically and intuitively and sometimes by memorizing or visualizing'. Hence an effective way of learning science is the need of the day which is nothing but experiential learning. The major purpose of experiential learning is to add value to life. Life without value is like a counterfeit coin. Value brings the radiance in one's life which is very much required for total human excellence.

Human Excellence is not only possible through the development of head but through the deep involvement of heart. Sathya Sai Baba says 'True education develop not head but also one's heart'. This is possible through bringing out 'personality development' via value education and complete self-development through

experiential learning irrespective of any subject(s). Therefore, it is only by developing such core values in students through teaching science; the school educational system can be sanctified and students can be trained to practice values as the essential condition for leading worthy lives which is of utmost importance in 21st century world. This juxtapose the onus on teachers in present schools to lead the change and the change is to defy the status quo i.e to do work differently and value each learner as a potential transformer of the 21st century world not the consumer of information in the present world. The researcher took the challenge and came up with the idea of value integrated experiential learning (ViEL) to teach Science in Standard IX .

Most of the commissions and committees related to secondary school education highlighted the plight of our education system prevalent in the country and suggested for better teaching and learning environment in the form of happy learning, stress free learning, safe learning and burden free learning climate in schools. In this regard one of the major concerns is related to existing teaching learning practices in science in particular. Because Science teaching is treated as learning bits and pieces of information in rote way without processing it which is counterproductive in nature. This traditional approach in teaching science is neither arousing interest of learner for science nor making science learning a pleasurable activity for them. Hence there is strong need to infuse a good teaching method in science particular, as it encompass several abstract concepts which can only be understood by deep involvement of learner in an interesting manner. Therefore present study is an attempt to make learning self-paced, convenient, interesting and learning by doing (not cramming). Value Integrated Experiential learning lessens the burden on teacher as students take the charge of their own knowledge construction and they enjoy it .Thus it help learner's to learn any topic at their own pace joyfully, in a burden freeway. It also motivates them and makes them enthusiastic to learn science very eagerly. Even the learning Science with *ViEL* is interesting, untiring and interactive one because throughout six step process, students are constantly engaged in discussions and deliberations. Most striking features of *ViEL* is that it offers wide range of opportunity like group activity, integration of interdisciplinary activities (i.e bringing language, art, music, drama and science together), role plays (on relevant topics/life stories of scientists or contemporary issues with science), value integration through storytelling and value songs and use of technology (multimedia) during presentations, value

games literally made it interesting one for learning science. The present study attempts to teach science through value integrated experiential learning. The effectiveness of ViEL solely depends on teacher planning and student's deep involvement in it.

5.1.0 IMPLICATIONS OF THE REVIEW OF RELATED LITERATURE FOR THE PRESENT STUDY

The review of sixty one research studies reveals that, most of the studies have concerned themselves with Science curriculum, its transaction (methodology of teaching), evaluation etc. A very few studies has been conducted on value integration during classroom transaction. The review of related literature also indicated that the post basic schools provided a better atmosphere in schools to inculcate moral, social and religious values as compared to ordinary schools and there is difference between urban adolescents and rural adolescents, college adolescents and school adolescents, and the male and female adolescents with respect to different types of values (Paul, 1986).Therefore value inculcation is one of the major part of teaching science curriculum to students which is missing in today's scenario. The pedagogy of teaching –learning in science offers open challenge to teachers involved in teaching profession as with changing times, the pedagogical change is taking place at a rapid pace. Hence there is a need to shift towards new pedagogy in teaching of science called constructivist paradigm. Experiential learning is one of the important constructivist pedagogy. This has catapulted the researcher to undertake a study which not only makes science learning joyful but also enhance value base in students life and hence the culmination of Value Integrated Experiential Learning(**ViEL).**

There has been no study which consisted of the three variables (Experiential *Learning* with *Value Education* through *Teaching Science* called as Value Integrated Experiential Learning in Science (***ViEL***). The review has helped the investigator to have a clear perspective of the problem chosen for the present investigation. The review of the related literature has enabled the researcher to formulate the relevant assumptions for the suitability of the present study.

- Develop a better understanding of how school students learn science by experimenting.

- Develop ways of organizing the content of secondary school science (standard IX) for more effective learning.
- Develop materials and other resources for the teaching and learning of secondary school science(standard IX).
- Integrate experiential learning approach for better understanding of secondary school science especially in std.IX.
- Develop an understanding about values associated with school science and development of strategies for value practices through science education.

Moreover the classroom's overwhelming emphasis on learning through telling and simple memorization overruns all considerations of empiricism, even the pedagogic utility of experiments. Ultimately, what is learnt in school is linked only to life within the boundaries of the school. It has little to do with the life outside (EVSF-2012; NCERT).

It was also observed from the review that the experiential learning approach in teaching science in CBSE schools of Navsari had not been tried out. It was also realized that Science curriculum transaction had not been approached from the perspective of value inculcation. The role of teachers also need to be adequately explored in relation to curriculum transaction through value integrated experiential learning as this does not appear to have received sufficient research attention.

The present study is much more relevant today as we are engrossed with multistage value crises in our society and the findings of the study would be of great help to the schools of Navsari, teaching community, State govt. and Central govt. for policy formulation point of view. Also it is important for future researchers that the tools prepared by the investigator were new in research and it is the original contribution of the researcher for this study. The present study differs from the others in terms of population and sample. Thus the present study is not only unique but also in depth in nature.

5.2.0 RATIONALE OF THE STUDY

Since child come to school in his formative years, he undergoes several experiences that influences his moral development. Therefore, moral development of the learner is the indirect responsibility of schools.

From moment of conception, human being undergoes process of development. In adolescence (11-20years) period physical development includes rapid physical growth, cognitive development include abstract thinking, development of scientific reasoning and attitudes-behaviours. This is the time when they decides to imbibe what is important to them, re-evaluates the values they inherited from their parents and society. Thus the adolescent years form an important part of growing up and learning to cope with the demands society puts on the child as they approaches adulthood. Therefore the strong foundation of values education perhaps needed at this stage in order to invigorate their personal qualities and core life principles. As secondary education starts with classes IX-X, leading to the Higher Secondary classes of XI-XII, it serves as a bridge between elementary and higher education and prepares young persons between the age group of 14-18 years for entry into the world of work or for entry into higher education (Dutta, et al**,**----),the quality of each learner matters .

As far as learning is concerned, the primary mode of learning is to gain experience of the physical world around us by acting on it in various ways and noting what happens. This is instinctively the young child's mode of learning. It is quite true to say that the natural sciences are observational. Experimental studies demands thought and imagination (Varghese, 2013). Science today at secondary level is taught in an autocratic fashion. Teachers find difficulty to respond to basic aspect of teaching science in schools viz.

- How do I know what I know? (Process aspect- cognitive ability)
- How well do I Know it? (Understanding of science-affective domain)
- Can I or others repeat this procedure? (Transferring skills-psychomotor domain)

The Content led teaching learning approach virtually has failed to accommodate both *cognitive –affective-psychomotor domain triangulation* and it has made our learners' mind as mere storage house rather than makers of new science. Thus, experience based science learning seems vital for our secondary students.

Moreover Times of India report by (Narlikar, 1999) 'Decline in Science Education' highlighted the plight of Indian Science Education scenario. According to him there was a sharp decline in number of students and standard in science education in India. The major factor behind decline was sub-standard quality of teaching and text-books in science subjects, ill-equipped laboratories, and craze for scoring high marks in

examinations. A rather similar concern has been expressed in Indian education policies. According to NCF (2005**)** our age old traditional teacher dominated read and remember till asked" and "chalk-n- talk" practice ought to be replaced by pupil centered constructivist teaching learning process. The level of language, pedagogical gap in content lay out, inclination towards more problems etc. seems to impediments in understanding intricate science concepts which requires a high quality science teaching in schools.

The science education system in India needs *Scientific Humanism* i.e. a concept which involves a progress in technology in relation to our cultural, economic, social spiritual, ethical and human values. This should be the aim of our school and higher Science education **(**Kalra, 2008) which is again reflected in 'Education for Values in School Frame work' (2012), Education must imbue children with a proactive social conscience. This implies strong value oriented education for our students.

True education equips individuals to live creatively, responsibly and peacefully in society, and becomes agents of change for a better society. However due to higher emphasis on cognitive domain for academic success and the total neglect of the affective domain(i.e. creating total alienation between Head –Heart-Hand) has converted children into machines which defeats the very purpose of education. In a same way Singh (2005) opines that "Education, besides cultivating student's intelligence, should help them to develop a personality where there is self-reverence, self-knowledge, self-control. *Vignan* (science) and *Pragyan* (spirituality) are cultivated as part of an integral process". Hence, there is an urgent need to bring seamless synergy among science education-Value education and Experiential learning which has a great potential to cater to the pressing need of the day. Therefore, in this context Value integrated Experiential Learning (ViEL) is proposed with a view to equip students to understand and situate scientific and technological developments in their cultural, environmental, economic and social contexts.

From the review of related literature the investigator has found that most of the research pertains to establish value inculcation, attitude formation, and achievement in science by employing hands on activity. Moreover most of the studies were based on survey method but no one has opted to go for experimental method except a few. Further the review also reveals that there were studies on value integration in science,

value education and less study on experiential learning but a very few study was dedicated to the value integration in science with the help of experiential learning and very negligible study in teaching science for inculcating values for standard IX students through experiential learning method in particular.

It is also very obvious from the studies cited above that the ViEL is more relevant and time appropriate with regard to global pattern of learning. Thus the investigator finds that research problem more appropriate for the experimental study. The present study is an endeavour to cater to the pressing demand of stimulating value inculcation and Science education through experiential learning method among students of standard IX in CBSE schools. Hence, the researcher made an attempt to undertake a study including, Science Education, Value Education and Experiential Learning.

5.3.0 RESEARCH QUESTIONS

The following research questions were in the mind of the researcher that lead the researcher to undertake the proposed study.

1. Whether values can be inculcated through value integrated experiential learning approach while teaching science?
2. Whether integrated approach of experiential learning for teaching science will affect the achievement of students in science?

5.4.0 STATEMENT OF THE PROBLEM

Teaching Science to Standard IX CBSE Students through Value Integrated Experiential Learning.

5.5.0 OBJECTIVES OF THE STUDY

1. To develop an intervention programme through value integrated experiential learning approach for teaching of science to standard IX students for the inculcation of values like: Learning to live together, Team work , Loyalty to duty, Tolerance, Flexibility, Curiosity, Environmental ethics, Compassion, Gratitude, Quest for knowledge, Discrimination, , Honesty, Spirit of inquiry, Co-operation, Equality, Simplicity, Determination, Common goal, Dignity of labour, and Discipline.

2. To implement the developed intervention programme for teaching of science through Integrated experiential learning approach for the inculcation of the taken values.
3. To study the effectiveness of the intervention programme on integrated experiential learning approach for value inculcation in teaching science in terms of value conceptual knowledge, value perception and value practice of the taken values along with the achievement in science.
4. To study the reaction of students towards the intervention programme on Integrated Experiential Learning approach for value inculcation in teaching science.

5.6.0 HYPOTHESIS

The present study is an experimental study. As per the objectives of the study following null hypotheses has been formulated for the testing in the present study. There were 43 hypotheses tested for the present study at **0.05** level of significance.

For the objective -3 twenty hypotheses ($H_0$1- $H_0$20) were formulated for twenty different values in terms of value conceptual knowledge.

$H_0$1: There will be no significant difference between mean post- test value conceptual knowledge of learners taught through the Value integrated Experiential learning approach and learners taught through the Traditional Teaching Approach in the value of Learning to live together, Team work , Loyalty to duty , Tolerance, Flexibility, Curiosity, Environmental ethics, Compassion, Gratitude, Quest for knowledge, Discrimination, , Honesty, Spirit of inquiry, Co-operation, Equality, Simplicity, Determination, Common goal, Dignity of labour, and Discipline.

$H_0$21: There will be no significant difference between mean post-test value conceptual knowledge of learners taught through Value Integrated Experiential Learning approach and learners taught through the traditional teaching approach in twenty selected values.

Similarly for the objective -3 twenty hypotheses ($H_0$22- $H_0$41) were formulated for twenty different values in terms of value perception..

$H_0$22: There will be no significant difference between mean post- test value perception of learners taught through the Value integrated Experiential learning approach and learners taught through the Traditional Teaching Approach in the value

of learning to live together, Team work , Loyalty to duty , Tolerance, Flexibility, Curiosity, Environmental ethics, Compassion, Gratitude, Quest for knowledge, Discrimination, , Honesty, Spirit of inquiry, Co-operation, Equality, Simplicity, Determination, Common goal, Dignity of labour,and Discipline.

$H_0$42: There will be no significant difference between mean post-test value perception of learners taught through Value Integrated Experiential Learning approach and learners taught through the traditional teaching approach in the twenty selected values.

$H_0$43: There will be no significant difference between mean post-test achievement scores of learners taught through Value Integrated Experiential Learning approach and learners taught through the traditional teaching approach.

5.7.0 EXPLANTION OF TERMS

Value Practice: The value practice in the present study means the incidental behaviour of students.

Experiential Learning: Experiential learning in the present study means the process in which student construct their own knowledge in natural way in learning Science through six steps such as : Silent sitting , Topic initiation , Radiant thinking ,Mind Mapping and web charting, Group Activity, Presentation.

Value Education: The value Education in the present study means the wholesome development of personality including ethical development though teaching science for values like : Learning to live together, Team work , Loyalty to duty , Tolerance, Flexibility, Curiosity, Environmental ethics, Compassion, Gratitude, Quest for knowledge, Discrimination, , Honesty, Spirit of inquiry, Co-operation, Equality, Simplicity, Determination, Common goal, Dignity of labour, and Discipline.

Learning to live together: It is a feeling of an individual to become oneness with the members of own family and other members of the society. Major traits of a person having quality of Learning to Live Together are: assisting others to uphold living spirit, living in a joint family, live and let live ,much knowledge in a socially acceptable norms.

Team Work: Working together for the realization of common objective. Major traits of a person having spirit of team work are: to bring synergy to work for the goal, unity in achieving targets. Work to win, coordinated efforts.

Loyalty to duty: It is a trait of a person by which he remains committed towards any assignments. Major traits of a person having quality of loyal to duty are: sincere to one's duty and job, passionate about the work, faithful adherence to a cause, and allegiance to one's duty.

Tolerance: Tolerance is an inner strength which enables the individual to understand others. Major traits of a person having spirit of tolerance are: ability to develop deep understanding about any problem or situation, to give a thought to some bodies work, recognizing other religion, the ability to endure.

Flexibility: One's ability to cope with the changing needs or situations. Major traits of a person having spirit of flexibility are: working happily within all situations, adaptability to adaptive to any circumstances, easily persuaded etc.

Curiosity: A desire to find answers to questions or problems that comes on the way of day to day living. Salient features of a person having curiosity are: self-interest to know, of inquisitive in nature, spirit of asking question to self and others, to know something new, native to explore new things.

Environmental Ethics: One's self awareness about non harming attitude towards the nature. Essential characteristics of a person having environmental ethics are: respect for the environment, understanding nature's principle/laws, like to save environment, love for nature, and a person works to solve environmental problems.

Compassion: It is a state of feeling of oneness about somebody's problem. Major traits of a person having spirit of compassion are: feeling sympathetic for others, to help somebody, showing kindness to others, sympathizing deeply etc.

Gratitude: Individual's ability to express feelings honestly for the innumerable helps accepted from others. Salient features of a person having gratitude are: appreciating good work done to us by somebody, being grateful or thankful to others, deeply thankful to others for their help.

Quest for knowledge: A feeling of acquiring new idea or knowledge which leads a person to resolve some issues or problems. Salient features of a person having quest for knowledge are: exploring new knowledge or ideas, thorough investigation about anything, to establish the truth, passionate to understand the cause of anything, active partner in learning process, a noble goal.

Discrimination: It is the ability of an individual's will to keep oneself away from wrong practices. Major traits of a person having discrimination are: recognize difference, experimenting with self to arrive at logical conclusion, pattern of behaviour.

Honesty: It is an individual's ability of owning responsibility for wrong actions of oneself. Honesty comes through the core principle of truthfulness. Salient features of a person having honesty are: devoid of corrupt behaviour, act truthfully, think positively, thankful to self, refraining from lying etc.

Spirit of Inquiry: It is an individual's intention to search for cause (truth) of any problem when he is tempted by an external stimulus. Major traits of a person having spirit of Inquiry are: inquisitiveness, arguing with the self or the system in work. How things work?

Co-operation: It is a quality of an individual to work happily with people and helping others as and when they require. Essential characteristics of a person having co-operation are: to be helpful to others, to accommodate every one's view in a given situation, add value to any collective views and task accomplishment, working together without personal ego, help without any hope, to help or share burden to relax others, help during difficult times.

Equality: Equality means treating all persons equally without any discrimination on the basis of caste, sex and physical abilities. Major traits of a person having equality are : treating others by looking towards their due, gender neutral attitude, caste – creed – colour neutral feelings in heart, no partiality towards anybody, no discrimination among group members working in a team, constitutional value, no superior feelings among group members.

Simplicity: A good feelings for others and respecting every one. Major traits of a person having spirit of simplicity are: live in natural way , no show up to others ,following principle of natural call of life, not adhering to fashion, simple thinking and living, attitude to accept the self, not living for others.

Determination: The innate nature of an individual to exercise his will freely so as to form a desirable habit. Essential characteristics of a person having determination are: strong will to achieve something, firmness of purpose, boldness in decision, serious intention.

Common goal: Working together and helping each other to attain larger purpose. Major traits of a person having spirit of common goal are: achieving public goal, working together without self-interest, be a part of social goal, working with winning spirit, shared goals by all, promoting national integration.

Dignity of labour: Respect for the work irrespective of gender. In other words it is an individual's outlook to treat every work or assignment respectfully. Essential characteristics of a person having dignity of labour are: respecting all people irrespective of their duties or jobs, respect for all occupations/professions, positive attitude towards physical work and mental work, no job is thankless.

Discipline: A way life where in the individual exhibit regularity and obeys codes of conduct. Salient features of a person having discipline are: strict follower of rule, self-awareness about the work or decision, net behaviour, to train/control self.

5.8.0 OPERATIONAL DEFINITION OF TERMS

(1) **Value Conceptual Knowledge**: The value conceptual knowledge in the values is the total score secured in the value test prepared by the investigator.

(2) **Value Perception**: The value perception in the values is the total score secured in the value perception scale prepared by the investigator.

(3) **Achievement in Science**: The achievement in science is the total marks secured in the achievement test prepared by the investigator.

5.9.0 DELIMITATION OF THE STUDY

The present study is made keeping in mind with the following delimitations.

1) The present study is delimited to the lessons of std. IX NCERT Science Text book from chapters like (*Ch.1: Matter in our surroundings, Ch.2:Is matter around us Pure ?, Ch.5: the fundamental Unit of life, Ch.6: Tissues, Ch.8: Motion, Ch.9: Force and Laws of Motion, Ch.10: Gravitation (Half Chapter only),Ch.15: Improvement in Food resources*) during term I of the academic year 2016-17.

2)In the present study value is delimited to: Learning to live together, Team work , Loyalty to duty , Tolerance, Flexibility, Curiosity, Environmental ethics, Compassion, Gratitude, Quest for knowledge, Discrimination, , Honesty, Spirit of inquiry, Co-operation, Equality, Simplicity, Determination, Common goal, Dignity of labour, and Discipline.

5.10.0 DESIGN OF THE STUDY

The design one chooses is very much important to the validity of any conclusions that might be drawn from the research. Research design entails a logical and systematic plan prepared for guiding the entire research study. It specifies the objectives of the study, the methodology, and techniques to be allotted. The present study was an Experimental research in nature and Quasi-Experimental research design was employed for the study. Also this design was selected because the investigator was limited to randomly assign subjects to the treatment and control groups. Moreover, Quasi-experimental designs that study the effect of treatment on single subject have been proven useful in behavioral sciences research. In the present study, a controlled group Pre-test, Post-test, non-equivalent group design was followed. A value integrated experiential learning (***ViEL***) intervention programme was developed by the researcher and implemented it on the CBSE Standard IX students as experimental group for teaching Science. The design of the present study is diagrammatically depicted as follow.

O1 X O2

O3 C O4

Where, O1 and O3 are Pre-Tests

O2 and O4 are Post-Tests

X= Experimental Group

C= Control Group

Following this design, two groups were selected with the help of convenient sampling as experimental group and control group. Pre-test was conducted to ascertain the level of understanding of students in science and values for both of the groups. Further, on the basis of the scores of pre tests both the experimental and control groups were made equivalent. The experimentation was done with experimental group and the control group was taught science in a traditional manner. At the end of the experimentation, post tests were conducted on both the groups.

5.10.1 Population of the Study

In the present study, population consists of all the students studying in standard IX in English medium schools affiliated to Central Board of Secondary Education, New Delhi, during the academic year 2016-17 in the state of Gujarat. In the state of Gujarat, there were 316 CBSE affiliated schools during the academic year 2016-2017, constituting approximately 18960 standard IX students. Hence, the population of the present study constituted 18960 standard IX students.

5.10.2 Sample of the Study

Considering the nature of the present study and the following the stated research design, the sample for the present study was selected using convenient sampling. Two similar schools from Gujarat state i.e. Sri Sathya Sai Vidyaniketan,Navsari and Sri Swaminarayan International School,Eru,Navsari both affiliated to Central Board of Secondary Education, Delhi were selected considering the convenience of the researcher to get access to the schools for the purpose of experimentation. Sri Sathya Sai Vidyaniketan, Navsari was considered as the experimental school and Sri Swaminarayan International School, Eru, Navsari was considered as control group as per the convenience of the researcher. There were 39 and 42 students in the standard IX of Sri Sathya Sai Vidyaniketan and Sri Swaminarayan International School respectively.

5.10.3 Tools for Data Collection

To achieve the objectives of the present study, the following tools were prepared by the researcher to collect the desired data for the present study which are as follows.

(i) Value conceptual Knowledge Test

(ii) Value Perception Scale

(iii) Achievement Test in Science

(iv) Reaction Scale

(v) Observation Note Cum Teacher's Diary

(vi) Anecdotal record

5.10.4 Development of VIEL

To achieve the objective-1 of the present study i.e. to develop an intervention programme through value integrated experiential learning approach for teaching of science to standard IX students for the inculcation of values like: Learning to live together, Team work, Loyalty to duty, Tolerance, Flexibility, Curiosity, Environmental ethics, Compassion, Gratitude, Quest for knowledge, Discrimination, , Honesty, Spirit of inquiry, Co-operation, Equality, Simplicity, Determination, Common goal, Dignity of labour, and Discipline. The researcher developed Value Integrated Experiential Learning (***ViEL***) for teaching science to standard IX students of section B of Sri Sathya Sai Vidyaniketan, Navsari, Gujarat during the academic year 2016-17 for the first Term. The main purpose of the intervention programme was to elicit values from students by teaching Science through experiential learning method along with enhancing their understanding about science. In the present study, the development of *ViEL* included five stages namely, *selection of Content, Identification of values, Preparation of lesson plans and planning for execution.*

5.10.5 Selection of Content

Contents for developing Value Integrated Experiential Learning were selected from Science text Book of NCERT (2006), First Edition. The chapters those were included for the purpose were Matter in our surroundings, Is matter around us is pure?, the fundamental units of life, Tissues, Motion, Force & Laws of motion, Gravitation and Improvements in food resources.

5.10.6 Identification of values

The researcher identified 20 values from the selected contents which were supposed to be inculcated among students while teaching science. Those values were , Learning to live together, Team work , Loyalty to duty , Tolerance, Flexibility, Curiosity, Environmental ethics, Compassion, Gratitude, Quest for knowledge, Discrimination, ,

Honesty, Spirit of inquiry, Co-operation, Equality, Simplicity, Determination, Common goal, Dignity of labour, and Discipline.

5.10.7 Development of Lesson plan

Lesson plans were prepared on the selected contents following the constructivist approach. In the present study, modified 5E lesson plan approach was adopted including the components like, Engage, Explore, Elaborate, Explain and Evaluate. Considering these 5Es, six activities were designed in the light of the steps of experiential learning. These activities were 1.Silent Sitting, 2.Topic Initiation 3. Radiant thinking, 4.Mind Mapping and web charting 5.Group Activity and 6. Presentation.

For each content, three to five lesson plans were prepared considering the 5Es of the constructivist approach, six steps of the experiential learning and the techniques to inculcate specific values. Attempts were made by the researcher in preparing the lesson plans to teach science to standard IX students highlighting the selected values adding different strategies to develop those values among students.

5.10.8 Procedure of Data Collection

The whole process of experiment was done in following three phases.

Pre Testing

Pre-testing was conducted in both the experimental and the control groups during the month of April 2016. The tools namely Value conceptual Knowledge questionnaire, Value Perception scale and achievement test in Science were administered to the students of both experimental group and control group.

Experimentation

The experimentation was done on the students of experimental group. They were taught science during the whole term I by the researcher during the month of April with the help of the developed ***ViEL***. During the same time the students of control group were taught science through their traditional method by their teachers.

Post Testing

After the experiment a post testing was done for both the Experimental group and control group. Value Knowledge questionnaire, Value Perception scale and

achievement test in Science were administered to the students of both experimental group and control group. Reaction scale was administered only to the students of experimental group.

5.10.9 Data Analysis

For the purpose of data analysis, the investigator used statistical tools namely; Mean, Standard deviation, Sum of ranks, Standard error of mean, Percentage analysis, intensity index, Mann -Whitney U in order to find out the impact of ***ViEL.*** The non-parametric test Mann-Whitney U-test was used to analyze the data as the sample was taken purposively, and it is considered as the most powerful non parametric equivalent of t-test of parametric family. Data collected through observation and anecdotal records were analyzed by using qualitative techniques, content analysis respectively.

5.11.0 MAJOR FINDINGS

Data analysis and its interpretations enabled the researcher to elicit major findings of the study which are explained as follows.

1. The intervention programme on Value Integrated Experiential learning (ViEL) was found to be significantly effective in terms of enhancing value conceptual knowledge of students in all the taken values except the values like: co-operation, simplicity, determination, honesty, common goal, discrimination, discipline, flexibility, , loyalty to duty , team work and learning to live together
2. The intervention programme on Value Integrated Experiential learning (ViEL) was found to be significantly effective in terms of enhancing value perception of students in all the values except the values like: tolerance, simplicity and discrimination.
3. The intervention programme on Value Integrated Experiential learning (ViEL) was found to be effective in terms of reactions of students towards the programme as most of the students showed favorable reaction towards most of the components of value integrated experiential learning.
4. The intervention programme on Value Integrated Experiential learning (ViEL) was found to be effective in terms of value actualization of students in all the taken values as these values were reflected in their activities.

5. The Science achievement of the students learned Science through Value Integrated Experiential learning (ViEL) was equal or more in comparison to the achievement the students of the control group in Science. It showed that ViEL had no negative impact on the achievement of students in Science.

5.12.0 EDUCATIONAL IMPLICATIONS OF THE PRESENT STUDY

Today, the school seems to be under attack more than ever before, because it concerns the very things that make a school to school. Precisely the pressure on school is to respond to the calls to maximize learning gains and optimize well-being and pleasure in fast and personalized learning for each and every learner. The researcher realized the importance of teaching science by taking cue from it, through Value integrated experiential learning. Following are some of the implication of the present study based on its major findings.

The results shows that the present study has been successful in bringing out twenty selected values in standard IX CBSE students by teaching them science in ViEL which is in consonance with the findings of (Bahadur, 1981) which states that there were some significant age trends (14-20 years) in respect of value development.

Findings of the present study shows that teaching through **ViEL** has reduced burden on students to read and write always as well as on teacher to dictate always, thereby enabling them to work collaboratively for developing a learning process that is essential for all. The urge for syllabus completion by the teacher can be diluted by adopting ViEL which involves all the senses of learner that stimulates the interest of learner to participate deeply in learning process which results lifelong learning of concepts.

The results also shows that in the process of Value Integrated experiential learning (***ViEL)*** the learners realized their ability to work towards personal integration, wholeness and a sense of harmony within. This means that the values they profess in the cognitive level are filtered down to the affective as well as the behavioural, thereby making them authentic persons who are true to themselves and becoming fully human. So, schools need to give a thought to it and provide a conducive atmosphere for it.

Further the present study also shows that Science instruction is extremely effective where students' interest was aroused by ViEL **.**Hence it is urged to teachers to nurture creativity in science class rooms for arousing the innate potential of each and every learner by using ViEL.

Study also highlighted that student liked self paced learning provision of ViEL. It not only helped teachers to teach effectively but also learners to learn in a better way. Hence in today's classroom context ViEL could find a place in teachers teaching reporteir and more encouragement is needed to create this awareness among teachers.

5.13.0 SUGGESTIONS

Study should be conducted to expand this value integrated experiential learning (***ViEL***) to other subjects and for other values like: Universal Human Values, Global citizenship conduct, Human rights, multicultural values, Environmental sustainability virtues etc.

Similar study can be conducted for other Indian boards like 18 state boards, ICSE, and international boards like Cambridge and IGCSE those are having pan India presence.

The instruments used such as Value Knowledge questionnaire , Value Perception scale, to measure the overall effectiveness of ***ViEL*** programme in teaching science can be standardized so that it can be extended to all schools across the bards of India for the value inculcation and its quantification.

According to Stewart (1985) over the past ten years cognitive science has emerged as a dominant perspective in psychology. This new view brings together researchers with overlapping interests from the fields of artificial intelligence, psycholingu-istics, psychology, epistemology, education and neurophysiology, ***ViEL*** may be tried out in consonance with above emerging fields which is having its bearings in our schooling systems in 3rd decade of 21st century.

5.14.0 CONCLUSION

The ViEL approach was successful in developing value conceptual knowledge, value perception and value actualization in all most all selected values. ViEL has the ability to transform education through inculcation of value conceptual knowledge, value

perception and value actualization. It can break the monotony, boredom of the class in many ways. The ViEL can play a meaningful role for the majority of students in 21st century Science education in general and secondary science in particular. For that reason, it is essential to evolve and incorporate ViEL learning settings in regular syllabus for awakening students' fascination for science again and again. Therefore Science teachers may be trained in ViEL mode for teaching Science. The findings of ViEL support building teacher competencies and nurture them as transformation agent. The findings of the present study can also be used for the development of instructional materials for the teachers and value based science learning materials for students in ViEL way. This type of model for teaching science can develop better outlook for science and develop more clarity of concepts which will sustain for a longer period of time for effective learning of Science.

The results of the study also support that ViEL is an effective tool to engage students in higher order thinking level of cognitive process. Thus ViEL offers a platform of learner centered and learning centered classroom where in every one would want to be and could be both teachers and students. In this context ViEL offers a plausible solution in teaching secondary school science and its major features will be among the valuable views of science education even after the term activity based learning will have gone out of fashion. The sky is the limit and there is a strong need to reinvigorate science teaching with objective of value inculcation through experiential learning endowed with a strong research support.

With the renewed emphasis on learning by HRD ministry through learning outcome document for standard I to VIII, it is clear that in Indian education system goods days will come for which necessary impetus to be given at secondary school science education (i.e adoption of Integrated Experiential learning strategy) which will augur multipronged effect in term of, enhancing learning outcome, overall renewal of quality of secondary science education in the country.

5.15.0 RFERENCE

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