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Antardrishti IUD Journal of Interdisciplinary Research

Journal home page: www.iudehradun.edu.in

IMPARTING VALUE EDUCATION THROUGH CONTENT AND PEDAGOGY OF TEACHING MATHEMATICS

Pratiksha Dixit[1*] and Dr. Usha Pathak[2]

[1]Principal, Springfields, Sector-10, New Moradabad-244102 UP, India
&
Research Scholar, ICFAI Education School, ICFAI University Dehradun, India
[2]Associate Professor, Teacher Education Department, DAV PG College, Dehradun, India

***Corresponding author's email: pratikshadixit41@gmail.com**

ABSTRACT

The main reason for various problems faced by us in our lives, be it at personal, social, economic, political and global level is the decadence of moral, socio-emotional, cultural and spiritual values. The philosophy, life and education are directly and closely related to the values. Everything, every thought, every belief and every opinion have one or the other value associated with them. If we are labeling them as good or bad, useful or harmful etc., we are actually indicating their values. A separate stream of curriculum is not at all required to provide value education but it is a must to recognize the value in the curriculum of every discipline and to know the relevance of the association of every knowledge and behaviour with the value system. Through this write up, it has been highlighted how the curriculum, content, syllabus and various pedagogies in mathematics help in inculcating the values in the learners. The best example is Vedic mathematics, the ancient way of teaching mathematics in Gurukul system where learners were taught the logical and critical thinking by means of experiential and innovative pedagogies which were educating the learners in real sense rather than just making them literate thus preparing them to face the trials in their lives ahead. Teaching mathematics helps out learners in many ways in life e.g., in attaining accuracy, being logical, freethinking or rational thinking and problem solving. It also helps in developing social and cultural values which indicate human's errands about mathematics education for society e.g., empathy, truthfulness, self-control and gratitude.

Keywords: **Disciplinary values, Innovative pedagogy, Cultural values, Subject content**

1. INTRODUCTION

Concept and Nature of Values:

Having the power of think, human beings always like to see themselves at the highest level of hierarchy. Hence it is their tendency to make efforts towards attainment of the good values like self-recognition, self-determination, self-realization and self-coordination. They fix specific goals in their lives and in order to achieve those goals, they keep the values which are significant for them in life. Thinking about the values lead them to the real vision of life which is essential for their meaningful survival. Values are imbibed in every aspect and needs of life from biological to spiritual needs. We can say that values are the abilities selected by the human being, the abilities by virtue of which he is capable of recognizing, assessing and attaining the values in his life so that he can differentiate between the good and the bad to select the good. The aim of human life is to experience the values from philosophical perspective. Education is the process of attaining this objective. Hence it is said that there is a very close relationship exists among the three pillars of humanity; education, Philosophy and life.In each branch of philosophical thinking, there exists a branch of Axiology which is mainly concerned with the study of moral, social, religious and spiritual values. Values have their own importance in every philosophical thinking. Naturalism consists of joyful feelings behind the moral values. Idealism emphasizes mainly upon the religious values embedded with the experiences based on faith in religion and in the preaching of religious great personalities and the relation between soul and God. According to Realism, values are mostly based on real experiences of life and are dependent upon the attitude and the interest of the person who is experiencing it. Similar to Naturalism, Realism also gives more importance to the individual over the society. Every individual frame his values according to his economic and social needs. In Experimentalism, the existence of values depends upon the reactions taking place between the individual and the society and the values are formed because of these reactions. They are not pre-determined. In this way, values keep on changing with the experiences of the individual as well as the changing circumstances of the society. Values do not depend upon any one's wish or not belonging to a specific subject but on criticism and objectivity i.e., they are adopted after the wise selection only. Only those values are important which are not only giving satisfaction with reference to the present problems and challenges but is important in solving the future problems too. Values are omnipresent which evolve with the birth and continues throughout the life of the person. Our behaviour is guided by our values and gives us the desirable outcomes in terms of living the life efficiently. Being

relative in nature is an important characteristic of values. On this ground, value is a reflective point of view which is a source of assessing the object, event, belief etc., in a relative way. Hence values are the standards which asses the good and bad, truth and the lie, beautiful and ugly, useful and unusable, knowledge and ignorance etc. The meaning of value is always positive and this is the reason why values are used as a synonym of goodness. Hence the values are the developed generalization of goodness at micro-level which is accepted as a universal truth. Its implications are visible in the areas of moral behaviours, experiencing the beauty, religion, education, society etc.

Need for inculcation of values:

In present times, the main reason of individual, social, political, economic, familial, national and international pressure or tension is the decadence in moral, social, cultural and spiritual values which results in increasing exploitation of poor and weaker section of the society. People are becoming opportunistic, enjoyer, selfish and duty-alienated. This attitude of people towards life hasplayed a major role in giving birth to indiscipline in education, unfaith towards labour, apathy and indifference towards responsibility and accountability etc. That's why imparting value education in classes in schools and colleges has become a basic necessity which can play a vital role to bring a qualitative change in educationPandey V C (2005) **[1].** It is the responsibility of value-based education only which can help the youth to free from anger and the insecurity feeling towards their future. Hence it is required to develop such perpetual values by means of education which are the strong base columns or pillars of the humanity and human society, which are generated for the purpose of maintaining welfare-harmony in the society **[2].** This is the time when we need education which can save the universally accepted perpetual values like equality, untouchability prevention and secularism.

2. METHODOLOGIES OF INCULCATING VALUES

At present time, this is a matter of great concern for the academicians how to make arrangements of value-based education to face the challenges which are caused due to various problems especially related to the young generation. Hence rather than developing a separate curriculum for theoretical knowledge of moral education, it is essential to identify the values in every curriculum **[3]**. It is needed to know the relevance of how every knowledge and behaviour is associated with values and also to assess to what extent the thinking of different philosophers in context with the real-time challenges. e.g., is the truth and non-violence-

based thinking of Mahatma Gandhi able to irradicate the issue of terrorism? It is essential to visualize the coordination between realism and ideals under different subjects.The main reason of decadence of values is the difference between these two above mentioned factors.

There is a need to corelate the content and requisites of value education with those of the other subjects. e.g., the aids and content of mathematics subject helps in obtaining all values. On one hand the practical value-based application of Mathematics is related with the utility of it in practical life and on the other hand, to the regularity and serialization of nature e.g., regularity of solar system **[4]**.

Disciplinary Value of Mathematics: The disciplinary value of Mathematics is related to learners' regular, disciplined, honest, originality, self-realization, self-assessment and logical thinking.

The cultural value of mathematics:It is related to the contribution of every field needed in the development of life, whether it is science or arts or music.

Aesthetic value of Mathematics: The aesthetic value of Mathematics is related its value of entertainment.

Scientific perspective and approach: It led us to the right decision which logically explains the cause-and-effect relationship and helps in search of truth. e.g., Newton's third law of motion in the form of action-reaction exhibits the direct relationship between the planningof action andeffects of results. Values introduce the various types of practical forms of life for teaching of which a specific period is not needed **[5].** Under the influence of such values, education gives us the insight to take right decision about the options of the behaviors. The value of its appropriate utilization is needed for appropriate use of these resources of nature. The aim of political value is for social welfare. But if it is limited to personal selfishness then its result would be giving insecurity giving rise to grudges. Hence the objective of value education is to develop the right kind of attitude and standards among the learners. When we talk about Mathematics, it is essential to attain the objectives of education by the learners e.g., analysis, synthesis and assessment which develops the ability of recognizing the form and nature of any knowledge among the students. It encourages the new creation, helps in developing critical perspective about the outcomes, and to determine the criteria towards the right kind of decision **[6]**. Hence it is the responsibility of the faculty of mathematics to develop the above-mentioned attitudes in their subject area. They can include various

methods e.g., debate, seminar, quiz, essay writing, creative writing, excursion tours, projects and assignments for the same.

Different types of activities like linguistic activities, physical development activities, aesthetic and cultural activities, activities to inculcate socio-emotional feelings, Social welfare activities, leisure time and vacation activities etc. must be included in the regular schedule in the schools or colleges. These activities train the learners for many values e.g., educational, psychological, social, civic, physical development, recreational, cultural values etc. Values can be taught in schools by following an interdisciplinary, multidisciplinary and transdisciplinary approach e.g., concept of shapes in Mathematics can be taught by using Arts and craft which helps in developing the values of team work, collaboration, creativity etc. It means by using social science, science or Arts lab in Mathematic, teachers can be motivated to inculcate the values by using experiential learning in which the experiments done to enhance the values and their outcomes can be studied as achieving those values. To assess the values among the students, development of bonafide tests tools or assessments can also be a part of research area.

Multifaceted problem-solving approach in Mathematics can help in identifying the causes of decadence in values and the suitable solutions for the same. Teachers should act like role models in this direction to preserve the values and can develop the right kind of attitude among the students by motivating them for searching the new knowledge on their own, think critically and for the research work. One needs to introspect himself to learn about the beliefs and value system. In schools the indoctrination can be done by the teachers in such a way that the learners are inept of reviewing and implement them **[7].**

3. DISCUSSION

Teaching Values by Integrating Problem Solving into the Mathematics Class:

Learners can be taught ethical and moral values along with the other values in the classroom while teaching Mathematics when solving word problems, non-routine problems or real problems related to their day-to-day life activities with them **[8].**

i) Word problems: It makes the students ready for the challenges of life by applying their common sense because they are related to the real-world circumstances and situations. e.g., 7 students agreed to share their chocolates. They received 254 chocolates. Help them to find out how many chocolates they will get each? To solve such problems, learners need to

apply commonsense and general knowledge besides the bookish knowledge taught by the teachers in class. Similarly, to teach the value of money, concept of money should be explained not only in terms of buying and selling but beyond that.1 Students can understand the importance of money by asking them the questions like How much money is spent by your parents on you in a year?

We can ask students to frame their own questions so that their understanding can be enhanced and they will start thinking in a different way that there can be various ways to look at and understand any problem. This way, they can understand by focusing on the value hidden in a problem as well as the mathematics **[5].**

ii) Non-routine problems: It helps the learner to increase his logical thinking, concept building, plan out problem solving methods e.g., find out the number which if divided by 3, gives 1 as remainder.

Real Problem solving by using experimental method: Following are the steps which help the learner to develop scientific skill and to research the new knowledge:

Identifying the problem, framing the research question, planning the research design and hypothesis, testing the hypothesis, analysis of data, reflection and report writing

"The final thought to leave with students is that they can be researchers and producers of new information and that new knowledge can be produced and communicated through mathematics. Their findings may contribute to the knowledge base of the class, the school, the community, or society as a whole."**[9].**

It is the responsibility of the educators to first train themselves professionally, ethically and morally to create an environment of value-based education in the classroom and among the students in the institution **[10]**.

It contends that an emphasis on schooling for social and the other values unavoidably includes teaching about qualities. In spite of the fact that there has been important work done in the socio-emotional field, both by and large and according to math, and in responsive, civilizing and edifying issues, the emphasis on value-based teaching is comparatively very less. Educators are once in a while mindful of teaching values through their lessons either unequivocally or directly. If we need to alter the ways of arithmetic education to be more receptive to life in present day societies then this part of math schooling should be better perceived by the teachers so that it tends to be more beneficial to make the students educated in real sense **[11].**

Hence, we can say that the following values can be inculcated by teaching mathematics:

1. **Intellectual values:** It helps in developing intellectual powers like imagination, memorization, observation, invention, concentration, originality, creativity and reasoning by solving mathematical problems.
2. **Social values:** Teaching mathematics can help learners in acquiring the social values e.g., tolerance, open-mindedness, objectivity, honesty, truthfulness, co-operation, will power etc. which helps him in organization and maintenance of social institutions like banks, railways, post offices etc.
3. **Moral values:** It helps in developing moral values among the students like honesty, truthfulness, justice, dutifulness, punctuality, self-confidence, distinguishing between right and wrong, cleanliness, patience, respecting others, listening to others etc. They also learn to shed off the feelings of hate, jealously etc.
4. **Disciplinary values:** Learning of mathematics creates discipline in the minds of learners because knowledge of mathematics is exact, to the point, logical and real. It also helps the learner to develop an ability to grasp and understand a situation, analyze it and perceive correctly the state of affairs.
5. **Imbibing qualities:** following qualities are grasped by the learners: simplicity, accuracy, originality, certainty of outcomes, reasoning, verification of results and concentration and focus of mind.
6. **Cultural values:** As it is said that mathematics is the mirror of civilization, scientific and mathematical developments decide the welfare of our civilization. It helps in development of various subjects and occupations. It also helps in promoting cultural heritage by transmitting it to the future generation.
7. **International values:** Mathematicians, by researching their ideas among different nations by circulating books and journals and by participating in conferences and seminars.
8. **Aesthetic values:** Mathematics is very closely associated with arts, drawing, painting, music et. Hence give pleasure to the learners in solving mathematical problems. Learners learn to play the musical instruments by following the rules of mathematics.
9. **Vocational values:** Students are prepared for a number of vocations by teaching mathematics e.g., Agriculture, accountancy, banking, engineering, IT, Tailoring, carpentry, surveying etc. In the present era of technological advancement, digital values can be inculcated to create better digital footprints by training the learners for digital literacy **[12].**

1. **Psychological values:** Positive attitudes such as open mindedness, reasoning etc. can be learnt by implementing fundamental principles of psychology e.g., learning by doing, learning through problem solving, learning by experiential method etc.

   By making the activities like counting, measuring, locating, designing, playing, explanation etc. in the class can reduce the mathsfobia of students and at the same time as a cultural phenomenon training the students for rationalism and objectivism thus bringing a positive change in the attitude of learners **[13]**
2. **Societal Value:** Problems associated with every day life can be utilized in the class to create an interest among the students towards maths which is otherwise a difficult or boring subject for them. It also helps in developing teambuilding and collaboration among the students. e.g., problems related to measurement of their height, money and time sums etc **[14].**

   In the field of education, values are associated with the objectives, curriculum, pedagogies, learners and the educators. Hence it is necessary to give value education in the schools **[15].**

4. CONCLUSION

We need to include value education in the curriculum right from the early stages to guide the learner about sustainable development so that he can understand the value of preserving the resources balancing the equilibrium of nature. Teaching values through the mode of problem-solving approach in mathematics can be taught by training learners to face the challenges of life evolving general knowledge and common sense and in understanding to be judicious in use of knowledge that is to know the appropriateness of a particular knowledge for in life specific purposes.

Learning of mathematics helps in the development of very useful values in the students. It is the responsibility of the teachers to be resourceful with his deliberate efforts and planning to make the students realize these values. Students learn the values of love and kindness, honesty, hard work, patience, cooperation and team work, empathy, forgiveness, respect for others etc. by mathematics.

REFERENCES

[1]. Pandey V C (2005), Value Education and Education for Human Rights, ISBN: 81-8205-174-6, Isha Books, Delhi. pp-22-26.

[2]. Gupta M.L. & Sharma D. D.,(2019), Saamajik Niyantrantatha Parivartan, ISBN 978- 93-5173-517-5, Sahitya Bhawan Publications, Agra.

[3]. Education for Values in Schools: A Framework, NCERT retrieved from https://ncert.nic.in › publication › otherpublications

[4]. Kumar Sudhir &Ratnalikar D N, (2003), Teaching of Mathematics, ISBN 10-8126113316, Anmol Publications Pvt Ltd.

[5]. https://www.mathgoodies.com/articles/teaching_values (Date of access-07/05/2021) examples of word problems

[6]. Kulshresthta A K, (2021), Ganitshikshan - Pedagogy of Mathematics, ISBN: 9789386405647, R Lall Educational Publishers

[7]. Beck, C. (1990) Better Schools: A Values Perspective, 1st Edition, Falmer Press, London

[8]. Bird, M. (1983). *Generating Mathematical Activity in the Classroom*. West Sussex, U.K.: West Sussex Institute of Higher Education. ISBN 0 9508587 0 6.

[9]. Bohan, H., Irby, B. & Vogel, D. (1995). 'Problem solving: dealing with data in the elementary school'. *Teaching Children Mathematics* 1(5), pp.256-260.

[10]. Alan Bishop, Wee Tiong Seah, Chien Chin, (2011), 'Values in Mathematics Teaching - The Hidden Persuaders?' Second International Handbook of Mathematics Education pp 717-765

[11]. Wilson, B.J. (1986): Values in mathematics education; M. Quinton (Eds.),Values across the curriculum. Lewes: The Falmer Press, p.94–108

[12]. Sharma R A, (2019), Shiksha keTakniki Aadhar, ASIN : B07XRVD8YK, Anu Books.

[13]. Bishop, A.J. (1988). Mathematical Enculturation-a cultural perspective on mathematics education. pp-82, Netherlands: Kluwer Academic Publisher.

[14]. Yüksel Dede. (2006), Mathematics educational values of college students' towards function concept, Eurasia Journal of Mathematics, Science and Technology Education Volume 2, Number 1

[15]. Patil YojnaYatin, (2015), Value Education: Need of the Hour, ISBN: ISBN-13: 978-1512220988 ISBN-10: 1512220981, Pasaaydaan Foundation, pp 25-30, Retrievedfromhttps://www.researchgate.net/publication/293755836_VALUE_EDUCATION_NEED_OF_THE_HOUR.