# Teacher's Perception Regarding Inculcation of Values through Mathematics

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**Abstract**

*Values in human life are one of the important components in daily action. In our education, it is a debated subject because of the chaotic conditions one can observe in almost all spheres of life. This chaos is mainly due to lack of values in the education being imparted. It is the need of the hour to inculcate values in schools through different subjects and also through various methods. Mathematics is a core subject of study for the students in school curriculum. Mathematics learning results in the development of a number of fruitful values for the students. However, these values cannot be attained automatically by learning mathematics. Only a resourceful teacher of mathematics, with his or her efforts and planning makes it possible for the students to attain these values. A teacher can inspire students by what he or she is and not by what he or she knows. The purpose of this paper is to study about the teacher's perception regarding values and its need for the students as well as to find out the strategies and the topics used by teachers for inculcating values through mathematics. The study is qualitative in nature. As for the techniques used for data collection, questionnaires for the teachers and observation methods were used. Data collected were submitted for content analysis which was done on the basis of categorising the responses given by teachers that emerged from the research questions and objectives.*

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## Introduction

*'Education without values, as useful as it is, seems rather to make a man clever devil.'*

—C.S. Lewis

Education has a vital role as it is a primary need for everyone. Education enables us to learn a lot of things and provides a variety of opportunities. Providing moral values to students enables them to find the right path. Education without values makes a person devil. If a person cannot differentiate between good or bad, right or wrong, significant or insignificant, there is no use of such education. Values are roots of human character and thus determine human behaviour. A person with values can create a good society by spreading peace and happiness. Mahatma Gandhi also emphasises on values and said that, "Formation of character should have priority over the alphabet." Many other philosophers like Rabindaranath Tagore, Swami Vivekananda also talked about inculcating values in children. Therefore, it is necessary to know about the meaning of values.

## What are Values?

The term value has been derived from a Latin word '*velere*' which means 'to be of worth'. Value is a dynamic term used in different aspects. But mainly it stresses the significance of values at personal, community, national and global level. It may be described as an emotional attitude (affective) which motivates a person directly or indirectly to act in the most desirable way.

According to Zaleznik and David (1964), "Value as the ideas in the mind of men comparable to norms in that they specify how people should behave. Value also attaches degrees of goodness to activities and relationship."

## Need for Values

Values remain a part of discussion in many policy documents in India. These policies and commissions emphasise the need of value education in the school curriculum. In *Report of Education Commission* (1964–66), it is said that, "The weakening of social and moral values in younger generation is creating many serious social and ethical conflicts in western societies. It is not our purpose to enumerate a list of values to be inculcated. What we would like to emphasise is the need to pay attention to the inculcation of right values in the students, at all stages of education.

According to NPE 1986, "In our culturally plural society, education should foster universal and eternal values, oriented towards the unity and integration of our people. Such value education should help eliminate religious fanaticism, violence, superstition and fatalism.

According to National Focus Group on Aims of Education (2006), "Value education must be a part of the education system, values or virtues must be integral to the whole process of education. Value

education cannot be imparted as a separate bit of education; the whole education has to be value education. For this we need powerful reminders, in a variety of ways, of the Gandhian ideas of *ahimsa*, peace and harmony. The policies and commissions also emphasise the need of value education in order to make education a powerful tool for better living standards. Increasing indulgence of juveniles (teenagers) in crime is the proof of degradation of values in our society. For maintaining a peaceful environment in the society, it is necessary to provide value education to the students. Teaching values cannot be separated from the education system. We need to follow the ideals of legend Gandhi, i.e., *ahimsa* (non-violence) and peace. Values cannot be isolated as a different subject, but should be integrated with the curriculum. Values can be inculcated in the classroom through different subjects.

Mathematics is an abstract subject based on logical reasoning and analytical thinking. Mathematics is a part of our everyday life. It is all around us. It is the building block for everything we do. But students do not usually relate mathematics to their real life and thus it is difficult to think about inculcating values through mathematics. Many researchers have also worked on inculcation of values through mathematics and some have worked on mathematical values. Margret Taplin (2016) in his article "Teaching Values through a Problem-Solving Approach to Mathematics" has suggested some reasons why problem solving is an important vehicle for educating students for life by promoting interest, developing common sense and the power to discriminate. The researcher showed the problem solving approach as a vehicle which encourages flexibility, helps students in constructing their own ideas about mathematics and promote value education among pupils. Othman J. et al. (2012) also worked on "Unveiling the Values Inculcation Model among Mathematics Teachers in Developing Country: A Conceptual Approach." The study is based on mathematical values inculcation model, i.e., ideological mathematical value, attitudinal mathematical values, sociological mathematical values, motivational mathematical values and the findings of the study suggested that there is a significant covariance relationship between the constructs of values inculcation in mathematics teaching and learning.

The values cannot be attained automatically by learning mathematics. Only a resourceful teacher of mathematics, with his or her efforts and planning makes it possible for the students to attain these values. The purpose of this paper is to study about teacher's perception regarding values and its need for the students as well as to find out the strategies and the topics used by teachers for inculcating values through mathematics.

***Research Questions***

1. What is the teacher's perception towards inculcation of values through mathematics?
2. What are the strategies and topics in mathematics through which teachers inculcate values?

***Delimitation***

The study was confined to only 15 teachers of Kendriya Vidyalaya Sangathan (KVS) in Delhi.

**METHODOLOGY**

The study was qualitative in nature and included 15 Trained Graduate Teachers (TGT) of mathematics from five different schools of KVS in Delhi. Purposive sampling was used for collecting the data. Regarding the technique of data collection, questionnaire was used. Ten questions were framed as per the need of the objectives and research questions. The questions were mainly emphasised on teacher's understanding and awareness about the concept of values, its need for students and also on the techniques of inculcating values through mathematics. The questions were framed keeping in mind the objectives of NCF 2005, aims of education and the building blocks of values described by CBSE. Data collected were submitted to content analysis on the basis of categorising the responses given by teachers that emerged from the research questions.

**ANALYSIS**

The findings of the studies are as given below.

**Perception of teachers regarding 'Values'**

This question explained about the different views of teachers about values. On the basis of their responses five categories were framed. It mainly emphasised on the teacher's understanding about the term 'value' (Table 1).

**Table 1**

| Category 1 | Category 2 | Category 3 | Category 4 | Category 5 |
|---|---|---|---|---|
| Deep effective qualities, crucial component of effective environment | Behaviour according to social norms | Something that denotes the degree of importance of something | Something that describes the significance of axiology | That has worth for human kind |
| 26.67% | 20% | 20% | 13.33% | 20% |

In the dimension of perception of teachers regarding what are values, 26.67% of teachers explained that values are deep effective qualities and a crucial component of effective classroom environment. Equal percentage of teachers (20%) responded that values are something due to which people behave according to social norms and it reflects the degree

of importance of something which also has worth for human kind. According to 13.33% teachers values are something that describes the significance of axiology.

### Need of value education at the upper primary level according to teachers

This question elaborated the teacher's views about the need of value education at upper primary level (Table 2).

**Table 2**

| Category 1 | Category 2 | Category 3 | Category 4 | Category 5 | Category 6 |
|---|---|---|---|---|---|
| Provide opportunities to acquire knowledge, skills and attitude for self development | Energy can be streamlined easily at this stage | Values taught at this stage are relatively permanent | Will learn adjustment and cooperation | For the betterment of individual and nation | To develop activeness, adaptability, ambition, anticipation and accuracy |
| 13.33% | 6.67% | 13.33% | 20% | 33.34% | 13.33% |

In regards to need for value education at upper primary level, equal number of teachers (13.33%) responded that values provided opportunities to acquire knowledge, skills and attitude for self development and also developed activeness, anticipation and accuracy, and were relatively permanent. According to 33.34% teachers, value education was for the betterment of individual and nation. Around 20% teachers responded that it was essential for adjustment and cooperation.

### Perception of teachers on inculcation of values through mathematics

This question was about the teachers' views regarding inculcation of values through mathematics. Were teachers able to identify and inculcate values in correspondence to mathematics subject? (Table 3)

**Table 3**

| Category 1 | Category 2 | Category 3 | Category 4 | Category 5 |
|---|---|---|---|---|
| Time management, discipline and balancing situations through addition and subtraction | Hardwork, honesty, truth through problem solving | By group project, activities and value-based questioning | Truth and honesty by applying math in real life | By numbers and functions |
| 26.67% | 26.67% | 20% | 13.33% | 13.33% |

All the teachers were agreed for the statement that values can be inculcated through mathematics. Different teachers shared different views for the inculcation of values. Equal number of teachers (26.67%) responded that through addition and subtraction and through problem solving methods different values like time management, discipline, honesty, hard work, truth, etc., can be inculcated in students. According to 20% of the teachers, with the help of group projects, activities and value-based questioning, values can be imparted. Another equal number of teachers (13.33%) said that by applying mathematics in real life, the values of truth and honesty can be developed in students (Table 4).

**Table 4**

**Topic of mathematics which can be best used for inculcation of values through mathematics**

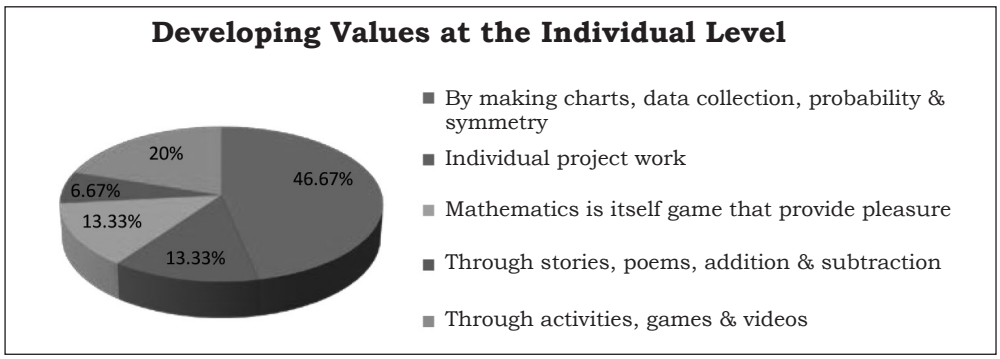
| Category 1 | Category 2 | Category 3 | Category 4 | Category 5 |
|---|---|---|---|---|
| Trigonometry, mensuration, geometry, and problem solving method | Each and every topic — that may useful for mental, spiritual or physical level | Mensuration, comparing quantities, and geometry | Arithmetic and percentage | Addition and subtraction |
| 20% | 26.67% | 20% | 13.33% | 20% |

The table shows that 26.67% of the teachers responded that each and every topic can be used for inculcating values through mathematics. Equal number of teachers (20%) said that trigonometry, mensuration, geometry, comparing quantities, arithmetic, and addition and subtraction can be used for the inculcation of values indirectly.

## Strategies and topics through which building blocks of values (developed by C.B.S.E) can be developed through mathematics

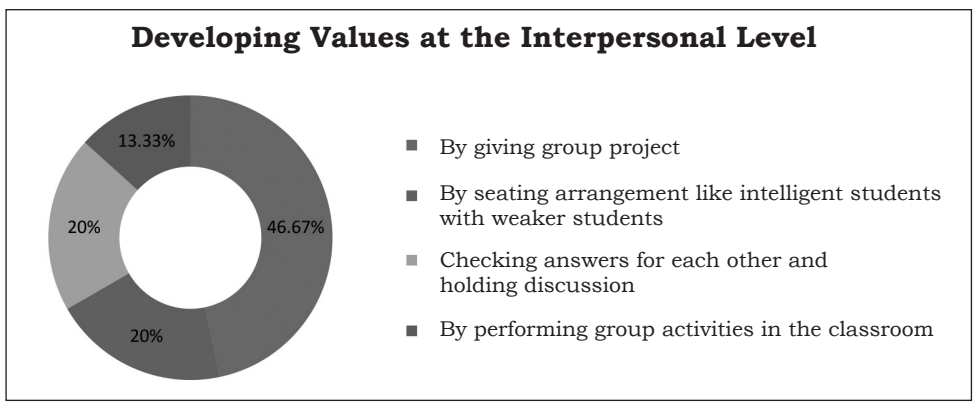
I. At Individual Level – trust, truth, joy, creativity

| | | | | |
|---|---|---|---|---|
| By making charts, data collection, probability and symmetry | Individual project work | Mathematics is itself a game that provides pleasure | Through stories, poems, addition and subtraction | Through activities, games and videos |
| 46.67% | 13.33% | 13.33% | 6.67% | 20% |



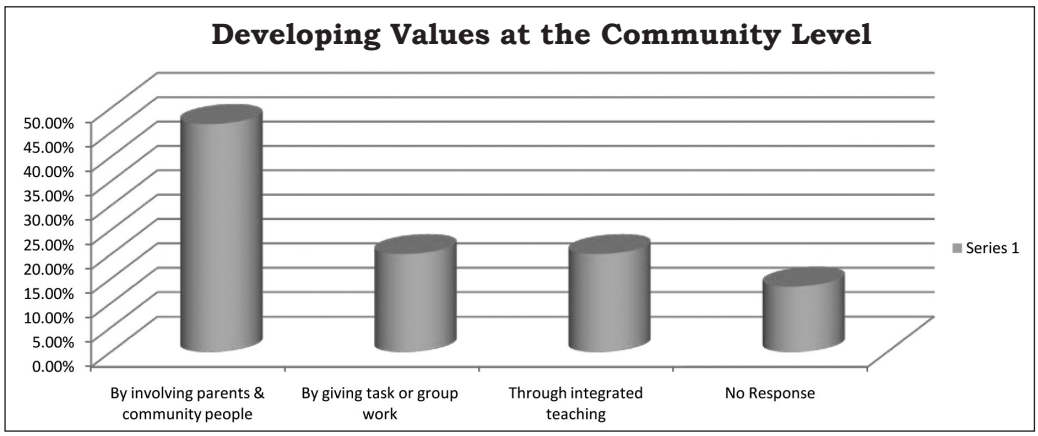

II. At the Interpersonal Level – empathy, cooperation, acceptance of differences

| By giving group project | By seating arrangement like intelligent students are made to sit with weaker students | Checking answers for each other and holding discussion on them | By performing group activities in the classroom |
|---|---|---|---|
| 46.67% | 20% | 20% | 13.33% |



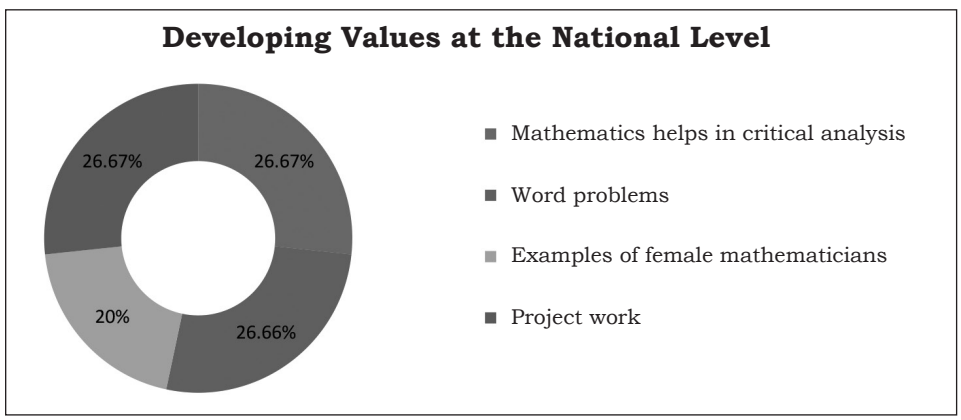

III. At the Community Level – tolerance, mutual respect, healthy family relation

| By involving parents and community people | By giving task or group work and explanation of work by each member | Through integrated teaching | No response |
|---|---|---|---|
| 46.67% | 20% | 20% | 13.33% |



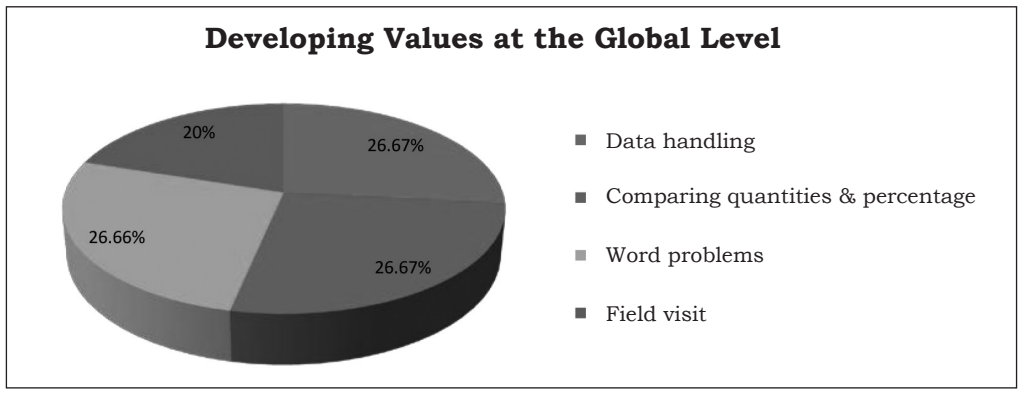

IV. At the National Level – freedom from biasness and stereotypes, national integration, equality

| Mathematics helps in critical analysis | Word problems | Example of female mathematicians | Project work |
|---|---|---|---|
| 26.67% | 26.66% | 20% | 26.67% |




V. At the Global Level – environmental concern, appreciation of world's heritage

| Data handling, e.g., states of pollutants | Comparing quantities and percentage | Word problems | Plantation of trees or field visit |
|---|---|---|---|
| 26.67% | 26.67% | 26.66% | 20% |




***Examples of inculcation of values through mathematics from classroom***

- While solving problems in group, students become disciplined and more hardworking by peer learning
- Students develop experience of full range of emotions associated in various stages of solution process
- Preciseness and accuracy in drawing geometrical shapes
- Correctness of a step taken in solving a problem
- Giving project work related to data handling
- Inculcating the values of sharing with the help of fraction and decimals
- During lesson plan of division the teacher can explain about the importance of accuracy
- During activities the method of teaching teachers can be explained by using deductive and inductive methods.

## Discussion

The need for value education should be emphasised for the holistic development of students and it is necessary that teachers keep these needs in consideration while teaching their subject.

The findings of the study revealed that teachers were aware with the needs of inculcation of values and they also enlightened values in students indirectly with the help of different methods used in doing mathematics like through group projects, activities and problem solving method. Researchers found that teachers used different strategies like data collection, project work, stories, poems, by involving parents and community people and topics like data handling, comparing quantities, word problems, addition, subtraction, division, fraction, etc., for inculcating values including trust, truth, empathy, cooperation, tolerance, mutual respect, freedom from biasness and environmental concern.

## Conclusion

The results of the study concluded that teachers have different perspectives regarding values and its inculcation through mathematics. It is clear that teachers use various strategies and with the help of different topics impart values in students especially problem solving strategies, word problems and group project were emphasised by the teachers. It is also concluded that teachers preferred almost same strategies and topics which indicated that there is a need to do lots of work through which teachers can spell out values for each and every topic of mathematics. Some workshops or in-service training can be provided for the teachers.

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