

Geographical Concept Seasons Related Misconceptions Held by School Students

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ABSTRACT

A number of student misconceptions are recognized in geography classes. These misconceptions are countering in their daily. In present paper discussed various misconceptions in geography and identified seasons related misconceptions in geography. A multiple-choice questionnaire with descriptive type question and focus group interview were conducted on 60 students of class IX student. Results reveals that many misconceptions related to seasons were identified. Implication of the study was also discussed.

1. Introduction

Geography (from Greek word *geographia*, meaning "earth description") is the science that studies the lands, the features, the inhabitants, and the phenomena of the Earth. Geography has been traditionally considered as major pillars of curriculum. It is the description of earth's environment, places and human relations with environment. Robert E. Dickinson, (1969) defined geography as "fundamentally the regional or chorological science of the surface of the earth" (p.22).

Geography teaching helps student' curiosity about various earth's related concepts which they counter in their daily life. Geography develops student's imaginations that enables students to relate to their daily experiences. Geography helps to understand world with reference to various places, geographical phenomenon, human relationship with their environment etc. Thus, geography has very important place in teaching learning process. National Curriculum Framework 2005 considers geography course incorporates important issues that make children sensitive to their environment.

Since geography acts as a bridge between natural and social science, it explains many concepts from both natural and social science. But in many literatures it is found that there are many problems faced by students in understanding of various geographical concepts. They have many misconceptions related to geographghical concepts which they held for a long period of time.

2. Misconceptions in Geography

Misconception is the wrong concept held by someone. Misconceptions are defined as something a person knows and believes but does not match what is known to be scientifically correct. Snieder & Ohadi (1988) stated the term 'misconception' is generally used interchangeably with 'preconceptions', 'naïve theories' and 'alternative frameworks' for students' personal views about some concepts. Those researchers who follow Vygotskian view defined 'misconception' as multiple, alternate mental representations of same phenomena (Spada, 1994). Misconception basically emphasizes the wrongness of student's conception. Misconceptions are very common to all academic

disciplines. Misconceptions arise with life experiences in a student's life. If misconceptions are learned, students will incorrect interpretation about many concepts due to their incorrect experiences, episodes, explanation by elders, imaginations etc.

There are many researches done in identification of misconceptions in geography. It has been seen that students face problems to understand the geographical concepts. Henriques (2010) explained children's misconceptions relating to weather, climate and atmosphere. There are also some studies found which examines misconceptions in geographical concepts held by university students. Students who enter in university has wrong conceptions related to phases of moon, causes of seasons and day and night causes (Atwood & Atwood, 1996; Ault, 1984a; Baxter, 1989; Vosniadou, 1991). A common misconception is involved in understanding of earth's layers and its process by students. They assumes molten earth material which is called 'magma' forms in the earth's very hot core. But in reality it originates in upper crust of the mantle and crust.

Above is the discussion about various misconceptions held in geography. In present study misconception related to season by secondary level students has been studies.

3. Seasons

Season is very interesting topic of geography. Every human being encounters different seasons every year. Season can be defined as subdivision of the year, marked by changes in weather and hours of daylight. Seasons occurs due to yearly revolution of the Earth around the Sun and the tilt of the Earth's axis relative to the plane of revolution. The main reason for seasonsl changes is the tilt of the earth's relative to the sun's rays. Figure 1 shows causes of seasons.

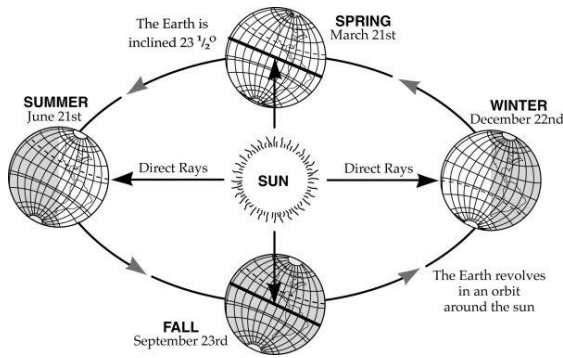


Fig 1: Seasons of the Earth

descriptive type questions were categorized under knowledge, understanding and application dimension of concept of season. Table 1. Illustrates distribution of items of questionnaire under the three categories.

Table 1: Distribution of Items Under Knowledge (K), Understanding (U) and Application (A)

| ITEMS | K | U | A | Total |
|----------|-------------------------|-------------------------------------------|--------|-----------|
| ITEM NO. | 1, 2, 3, 4, 5, 7, 9, 19 | 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, | 20 | 20 |
| TOTAL | 8 (40%) | 11 (55%) | 1 (5%) | 20 (100%) |

To know from where the students get knowledge about seasons and in depth knowledge of students about seasons, investigator conducted focussed group interview was conducted. Following questions were asked to students in Table 2:

Table 2. Focus Group Interview: Questions Asked Of All Students In The Study

| Questions |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ▪ Do you like Season topic in Geography? ▪ Do you understand seasons and its causes? ▪ When have you come across information about seasonal changes first time? ▪ When season topic was introduced by your teacher, do you face any problem to understand this topic? ▪ Does your family ever talk about seasons? ▪ If I ask you to get more information about seasons where do you prefer to get knowledge? ▪ Can you draw a diagram showing that earth is experiencing all four seasons at different positions? |

The focus group interview was conducted in class arranged by class teacher. All interviews responses were written on paper. Interview lasted from 1 to 1.5 hr and students were asked each question in order. In total 60 student participated in 5 focus group interviews (12 student in each focus group interview involved).

8. Data Analysis

The qualitative analysis was done to questionnaire and interview schedule. Responses to multiple-choice question were calculated in percentage form with percentage of correct, incorrect and unattempted responses. In descriptive type question were categorised into theme related to misconception in seasons. The interview was also analysed by extracting various misconception related to seasons and factors involved in origin of their conception related to season.

9. Result and Discussion

4. Review of Literature

Various researches are done in misconception of seasons. Schneps (1987) interviewed students about season. Very few students were able to explain correct reasons to seasons. Baxter (1989) found minority of students explained seasons in relation to the earth's axis and revolution. Sadler (1992) administered a multiple-choice test related to seasons to 1250 students. He found very few students had correct response to causes of seasons. DeLaughter et al (1998) examined only 17% students out of 149 students gave correct response to seasons. Many of the students were having wrong conception of causes of seasons. It has been that students enter in the school with lots of preconceived notions about their surroundings.

5. Research Question

In present study, investigator seeks answer to the following research questions:

1. To what extent secondary level students aware of the concepts of the seasons, more in particular about the cause of the seasons?
2. How the misconception related season originate in students?
3. How can misconception of seasons be overcome?

6. Aim of the Study

The study aims to investigate the misconception held by secondary level students related to seasons and to suggest some implication to overcome misconceptions related to geographical concepts.

7. Research Methodology

To obtain data for this descriptive study, two procedure were done to gather data. The present study is comprised of 60 sample from secondary level students studying in class IX in one of school situated in Delhi.

Instrument Used

To get insight into awareness of students' ideas in seasons, investigator developed questionnaire which was divided into two parts- first part consisted of 17 multiple choice-questions and second part consisted of 3 descriptive type questions related to concepts of seasons like process involved in formation of seasons, causes of seasons. The multiple-choice question and

In responses to multiple-choice questions based on knowledge from items 1, 2, 3, 4, 5, 7, 9, 19, only 20% students were able explain correct answers whereas 70% student gave wrong explanation to season concepts. 10% students did not attempt to these items. With reference to items related to understanding of season concept (item 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18), there were 80% percent students who were given wrong explanation, 10 % gave right response and 10% did not attempt. In application part of the item mostly student failed to give appropriate response.

After analyzing interview results, investigators found various misconceptions related to seasons. Responses are following:

▪ **Do you like Season topic in geography ?**

In response to this question students did not show any interest. They said they were not able understand the phenomenon of seasonal changes. They even did not know what the main reason is for the season. Researcher had also found that students did not have basic knowledge of *latitude, longitude, polar region, axis of the earth, earth revolution and rotation etc.*

▪ **Do you understand seasons and its causes?**

Most of student said they did not understand what process involved in season formation.

▪ **When have you come across information about seasonal changes first time?**

Most of the students said in the present class. Few students said they have come across to this topic in previous classes but they were not able to understand at that time. Mostly said this

topic was not cleared. Some students said that they had understood by themselves.

Very few said that they had learnt it from their parents and in their peer group.

▪ **When season topic was introduced by your teacher, do you face any problem to understand this topic?**

Student responded they felt bored while teacher were teaching this topic. Mostly said they were not able to understand.

▪ **Does your family ever talk about seasons?**

Students said yes their parent discussed about seasons at home. But investigator tried to get to know what their parent told them about seasons, investigator found most of the parents transacting wrong ideas about seasons. Even parents did not the right response to the cause of the season.

▪ **If I ask you to get more information about seasons where do you prefer to get knowledge?**

In response to this most of the students would prefer internet source. It seemed that they did not find any interest in the classroom teaching. Some of the students preferred self exploration, tutor and peer group. Very few would prefer to ask the teachers.

▪ **Can you draw a diagram showing that earth is experiencing all four seasons at different positions?**

Most of student failed to show diagrammatical representation of seasons. They drew wrong diagram of season at different position.

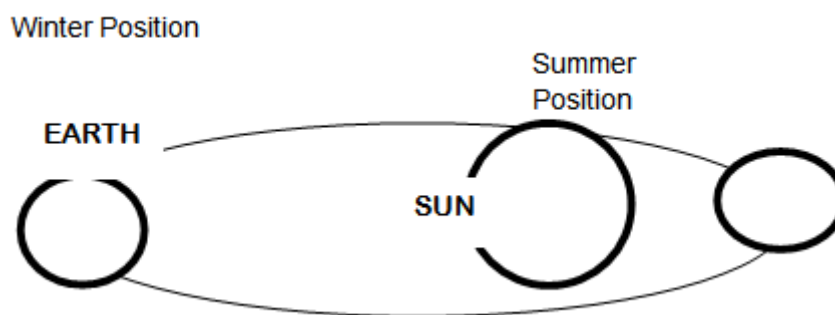


Figure 2: Misconception related to winter and summer season.

In the present study researcher had also found misconceptions regarding seasonal changes and formation of the seasons.

Some of the common misconceptions of seasons have been identified:

- That it is winter because it is cold or because of snow, or that it is summer because it is hot (*rather than it is cold because it is winter*).

- That we experience seasons because of the Earth's changing distance from the Sun (closer in the summer, farther in the winter), *instead of understanding that Earth's orbit around the Sun is almost a perfect circle.*
- That seasons change because Earth's tilt itself changes (*rather than the direction of the axis always remaining pointing towards the North Star as we orbit the Sun*)

- That the Earth is the center of the solar system (or that the planets, Sun and Moon revolve around the Earth), ***instead of the Sun as the centre of the solar system.***
- The area which faces towards sun , experiences summer and other parts which do not face sun rays, experiences winters that means opposite side of earth.
- That the degree of hotness in summer and degree of coldness in winter ***(rather than the days are longer in the summer—also a result of the tilt—and therefore we receive more of the Sun’s energy in one day than we do when the days are shorter in the winter. The higher and longer path of the Sun in the sky is during the summer months, and the longer the day, the more radiant energy is received from the Sun.)***

- There should be fun activity conducted in classrooms.

11. Conclusion

The present study explores students’ conceptual understanding of seasons and its formation. Understanding of any concepts cannot be assessed quantitatively. So this study was qualitative in nature. In the present study majority of students had difficulty in understanding of reasons for the seasons. Most of students thought that seasons form due to distance between earth and sun this misconception is based on Distance theory. Students were not aware of the characteristics of the different seasons. It seemed poor understanding of the surroundings. Even students were not able draw diagram of earth’s orbit correctly and formation of seasons correctly. In Focus Group Discussion it showed that most of the students were not satisfied with teaching methods adopted in geography. Their doubts were not clarified at the time of instructions. Most of the students also got wrong conceptions of season’s formation from their parents.

There should be some strategies adopted to overcome these misconception sin geography.

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10. Implications of the Study

- Teacher should pay attention basic concepts in geography in which students find more difficulty in understanding like concepts of latitude and longitude, time zone, shape of the earth and its orbit etc while planning their teaching learning activities and learning materials.
- Findings of the study can be used for improving the classroom strategies in teaching learning process.
- Teacher should always encourage students to ask the questions never let them to discourage to ask questions.
- Teachers should use computer aided strategies to teach these concepts.

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