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Exploring conceptualisation of polynomials

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Abstract

Present study was intended to explore the conceptual understanding of polynomials among respondents. 400 respondents were selected with due representation of gender. All respondents were selected from 10th standard of Government and private schools of Shopian District. Whole data was selected by using Random Sampling Technique (RST). The Polynomial test developed by Herl and Jain (2016) was used for data collection. The collected data was analysed to statistical treatment by using Mean, S. D and independent 't' test. The results exposed that three exists significant differences between male and female respondents on their conceptual understanding polynomials ($P < 0.01$). Male respondents were reported with high level of conceptual understanding of polynomials as compared to female respondents.

Keywords: polynomials, secondary school students

1. Introduction

Mathematics education, owing to reformation in mathematics in 1960s, has been based upon a structural approach. Therefore, it was thought that formulating mathematical definitions and deductive could be made accurately, which may improve mathematical teaching. However, it was seen that students continue to have their old usual difficulties in formal definitions (Tall 1988). According to Cornu (1991), teaching of most mathematical concepts generally does not start on virgin areas. Before learning any concept, students have daily experiences about that concept, such as certain intuitions, ideas, images, knowledge and colloquial meanings of used terms. This accumulation that students have beforehand, that is, conceptions, are so-called spontaneous conceptions. These concepts do not disappear during formal teaching, going in a circle with newly gained information, becoming current and being adapted to student's individual conceptions. In Indian education system, the teaching of polynomials concept is carried out in high school first grade classes after teaching numbers and function subjects. Goals for teaching polynomials concept are arranged in order as: to be able to comprehending fundamental concepts about polynomials, to make operations about polynomials, to understand factoring polynomials, to make operations about factoring polynomials, to comprehend rational expressions and equations and to make applications in rational expressions and equations. However gender variation has been observed in the same domain. In context to same, large number of researchers has reported gender inequalities are existing in the field of modern concepts of mathematics. Notable among them are; Cassell, London (1996) ^[1], Hiebert, J., Lefevre, P. (2012) ^[2], Hull, R. (2012) ^[3], Kluwer, Dordrecht (1991) ^[4], Lawrence Erlbaum Associates, Hillsdale (1986) ^[5] and Pergamon Press, Oxford (1988) ^[6]. Keeping in view, the investigator intended to explore the inclination of male and female students towards conceptualisation polynomials. The detailed statement of the problem is as under:

1.1 Research Problem

The statement of the research problem is as under:

Exploring Conceptualisation of Polynomials

1.2 Objectives

The objectives of the present study are as under:

1. To explore the conceptual understanding of polynomials among male and female students.

1.3 Hypothesis

Following hypothesis has been framed for the present study:

1. There exists no significant difference between male and female students on their conceptual understanding of polynomials

1.4 Operational Definition

The operational definitions of terms and variables are as under:

1. **Polynomials:** Conceptualisation of the polynomials in the present study refers the set of score obtained by the respondents on polynomials test standardised by Herl and Jain (2016).
2. **Male and female students:** In the present study, male and female students refers dichotomy of the respondents made on the basis of their sex.

1.5 Delimitations of the Study

The present study will be delimited Shopian district of Union Territory of Jammu and Kashmir. The study was delimited to 400 respondents of 10th class only.

1.6 Methodology

The present study was carried with the help of descriptive research method. The parameters involved in methodology and procedure are as under:

1.6.1 Sample

The sample for the present study consists of 400 respondents with due representation of gender. The age groups of the subjects were ranged 14-18 years. Whole data was selected by using Random Sampling Technique (RST) from 10th standard of selected schools. The below mentioned table indicates the precise explanation of sample:

Table 1.1: Showing the selection of sample with dichotomy representation

Category	MS	FS
Sample	200	200
Total= 400		

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- MS = Male Students
- FS = Female Students

1.6.2 Test used

The Polynomial test developed by Herl and Jain (2016) was used for data collection.

1.7 Statistical treatment

The collected data was put to suitable statistical treatment by using descriptive and inferential techniques. The detailed procedure of statistical treatment is analysed as under:

Table 1.2: Showing the significance of difference between dimension-XIII (Limit and Continuity) of Modern Mathematical Concepts (N=200 each)

Variable	MSSS		FSSS		‘t’ value
	Mean	SD	Mean	SD	
Polynomial	18.70	2.23	12.14	2.86	5.91@@@

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- MSSS= Male Secondary school students
- FSSS=Female Secondary school students

- @@@=Significant at 0.01 level of confidence

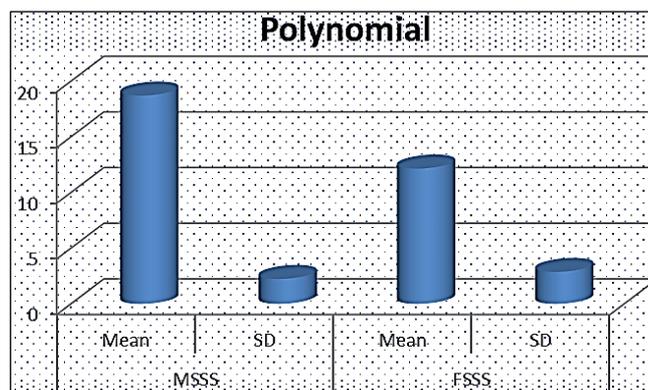


Fig 1.1: Showing the graphical representation of the male and female students on dimension-XIII (Limit and Continuity) of modern mathematical concepts

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- ❖ MSSS= Male Secondary school students.
- ❖ FSSS=Female Secondary school students

2. Discussion

The results presented in table 1. (Please consult table 1.1, Fig. 1.1) gives information about the comparative analysis of the male and female secondary school students on the conceptual understanding of polynomials. As per the perusal of the obtained the mean score of male secondary school students is higher (M=18.70, SD=2.23) then the mean score of female secondary school students (M=12.14, SD=2.86). When the both groups were comparatively analysed, the ‘t’ value came out to be significant at 0.01 level of confidence (5.91> table value at 0.01 level). Thus, from the above reported results, it can be inferred that male secondary school students hold high conceptual understanding of polynomials as compared to female secondary school students.

H₀: “There exists no significant difference between male and female students on their conceptual understanding polynomials.”

.....**Rejected**

Rejected

The results are carried in consonance of the host of the researchers like; Cassell, London (1996) [1], Hiebert, J., Lefevre, P. (2012) [2], Hull, R. (2012) [3], Kluwer, Dordrecht (1991) [4], Lawrence Erlbaum Associates, Hillsdale (1986) [5] and Pergamon Press, Oxford (1988) [6].

3. Conclusions of the study

It the present study it was inferred that there exists significant difference between male and female students on their conceptual understanding polynomials. Male respondents were seen with high level their conceptual understanding polynomials as compared to female students. Hence the investigator can inferred that the impact of gender is significant on the level of their conceptual understanding polynomials.

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