



A STUDY ON COMPARISON BETWEEN PARTIAL DIFFERENTIAL EQUATION AND ORDINARY PARTIAL DIFFERENTIAL EQUATION

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ABSTRACT :

Partial differential Equations are most probably used in differential calculus, derivatives w.r.t more than one independent variable are called partial differential Equations. It is also called partial derivatives Up to the boundary regularity results for second order linear elliptic systems in divergence form with Dirichlet or partial derivative type boundary condition are well known.

Difference between Partial & Ordinary Differential Equations

$$\sin 2x + e^{2y} \frac{dy}{dx} = 0$$

$$y^2 \frac{\partial y}{\partial x} + xy \frac{\partial x}{\partial y} = x^2 z$$

KEYWORDS : PDE, OPDE, Hodge jacobians. Charpit methods' Laplacian, lagrange's linear equations. Maxwell.

INTRODUCTION

Derivatives are two, three and n types (1) first order (2) second order (3) nth order

Ex : - i) $\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}, \frac{\partial f}{\partial z}$ are called first order partial differential equation

ii) are called second order partial differential equation $\frac{\partial}{\partial r} \left(\frac{\partial f}{\partial n} \right) = \frac{\partial^2 f}{\partial n^2} = f_{x_2}$ in generally $\frac{\partial^2 f}{\partial v \partial x} = \frac{\partial^2 f}{\partial x \partial v}$ order of partial differentiation is independent.

In partial differential having "Homogeneous Functions" of $f(\beta x, \beta y) = \beta^n f(x)$

SAMPLE FOR EXPERIMENTATION

Ex : Let $f(x,y)$ is a functions of two valuables and $f(x,y,z)$ is also functions of three valuables. Let $f(x,y)$ be a continuous funtions of x,y,z changes when x changes or y changes or when both x,y changes, when x changes y remains constant, when y changes x remains constant, partial differential denotes as $\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}, \frac{\partial f}{\partial z}$ etc. In partial differential equation

$\frac{\partial}{\partial x} \frac{\partial}{\partial y} \frac{\partial}{\partial z}$

There are three cities of Karnataka. Out of these three cities, Bangalore circle was selected randomly. Then in Bangalore circle, vijayapur district was selected randomly from the six districts. There are four blocks of vijayapura district, vijayapura block-I, vijayapur block-II, Hubli block and Dhawar block. Due to experimental study, the study was confined to single school chosen purposively. aided. School, vijayapur Pa block-II was selected purposively for experimentation. The school is affiliated to KSSEB. The Sample comprised 50 students of class 10th. The medium of instruction was KANNAD. There were single sections of 10th class. The intact original groups of the schools were assigned as control group and experimental group A

was the was assigned as experimental group and group B was assigned as control group. Group A and group B contains both boys and girls. Thus on the whole there were 28 students in group A and 22 students in group B

The group-wise and gender wise distribution of sample is given in table

Group	Boys	Girls	Total
Experimental Group	10	18	28
Control Group	10	12	22
Total	20	30	50

From the above table it is evident that the size of sample at field stage was 50. Of these 28 were in experimental group and 22 were in control group.

PROCEDURE

The study was conducted into two parts i.e. quantitative part and qualitative part. Details of this parts are given below

QUOTATIVE PART

In quotative part the study was conducted in three phases:

1) Phase-I

In the phase I, Bangalore circle was selected randomly out of three circles Vijayapura. Hubballai and Dharwar in Karnataka. Then in Vijayapur circle, Dhrawar district was selected randomly from six districts. Then from the different secondary and senoir secondary schools of the Vijayapur, aided senior secondary school, THT of Tilagul block-2) Phase II. This school was selected purposively due to the support and permission for experimentation and data collection by the school authorities for experimentation. Permission was taken from the HM of aided senior secondary school, THT in Vijayapur dist .Permission was granted by the HM of the school to conduct the study in morning school timings. Class 10th was selected for treatment as the study was delimited to 10th class students only.

In the phase-I original groups of 10th were assigned as control group and experimental group, i.e section A was assigned as experimental group and Section B was assigned as control group in experimentation. This was done so to control the intervening effect which the students may discuss about the treatment given to them with each other in the rest of school hours. Both the original groups i.e. experimental group and control group were motivated to be regular during those days as they were told that they were going to taught mathematics in different and interesting ways. Most of the students of the school got motivated and ensured their regularity in the class. On the day one of the data collection pre-achievement test was administered, on day two of data collection pre-mathematical creativity test was administered and on the day three of data collection pre-mathematical creativity test was administered to both the groups, i.e to experimental group and control group of mapping.

In the present study, following tools were used to collect the data:

Modules based on concept mapping (developed by investigator) were administered on experimental group. Achievement test in mathematics developed by investigator) was administered to study the achievement of students in mathematics. Mathematics anxiety scale (Sharma, Yogesh and Sansanwal; 2011) was administered to study the anxiety of the students in mathematics. Mathematical creativity test (Sharma, Yogesh and Sansanwal; 2012) was administered to study the creativity of students in mathematics. Modules based on concept mapping were prepared by the investigator for teaching mathematics to 9th class students of experimental group. For the selection of topics, discussions K.S.S.E.B was also considered while selecting

the topics. The list of topics selected were done with school teachers. Monthly distribution of mathematics syllabus given by is given in the above table

DEVELOPMENT OF MODULES

First draft

After the discussion done with school teachers and keeping the monthly distribution of syllabus given by K.S.S.E.B, the initial draft of modules was prepared. In this draft first of all three modules of chapters: - 1) Straight line covering the concept of lines, angles, parallel lines and non-parallel lines; 2) Triangles covering the concept of triangle, properties of triangles and congruency of triangles and 3) Circles covering all concept included in the syllabus from 10th class text were prepared.

Second draft

In the second draft of the three modules namely Straight lines, Triangles and circles were divided into its further sub topics as given in the table These 10 modules were made in such a way that each and every part of the topic is covered.

Validation of modules

list contained items on objectives of modules and regarding the content appended in the appendix.

Copies of the developed modules were sent to experts (10 school Teachers and 5 Teacher educators) for their evaluation on the check list and red for the improvement of modules. They were also requested to give their suggestions in writing to improve the modules. Suitable modifications on the modules were made and the final draft was prepared. Prepared modules were evaluated by TE and ST. Adopted checklist was used for the purpose of evaluation. The main characteristic of evaluation was the assessment of the objectives. This includes whether each module was accompanied by objective, wording of objectives is clear and easily understandable, how realistic and measureable they are, whether they are attainable or not. The details of all statements related to assessment of objectives along with average scores of TE and ST is given in table

Achievement Test in Mathematics

Achievement test in mathematics was prepared by investigator and has total of 54 items in the final draft after considering the Discriminating powers (DP) and Difficult value (DV) of the items in the mathematics Achievement Test. The items of achievement test in mathematics are written only in KARNATAKA language. The items of achievement test in mathematics pertain to knowledge, understanding and applications.

Time limit

The time required for completing all the 54 items was to be completed in one hour.

Scoring

Like other multiple choice questions test, achievement test in mathematics also have one mark for correct answer and the total marks for test is 54. The answer key of the achievement test in mathematics is given in the ANEXURE.

Split half Reliability

In the split half method, the test was first divided into two equivalent halves and the correlation was found for these tests. This method is also popularly known as odd/even method. The reliability coefficient was determined by adopting odd/even method. The procedure is to make up the two sets of scores of combining alternate items in the test. The first set of scores represent performance on odd numbered items and the second set of scores, performance on even numbered items. The test was administered on 120 students of

two schools from VIJAYAPUR District. From the self correlation of the half tests, the reliability coefficient of the whole test was calculated by spearman-Brown prophecy formula. The self correlation of the half test as found by Pearson's Product moment coefficient of correlation was 0.81 as given in the table 4 Mathematics Anxiety Scale. In the present study an attempt was made to assess Mathematics Anxiety of 10th class students of government senior secondary school affiliated to KARNATAKA School Education Board, KARNATAKA. The Mathematics Anxiety Scale comprised of 44 items pertaining to cognitive and affective dimensions. There were 22 positive and 22 negative statements to be responded on a three points scale.

Time Limit

There was no time limit but generally students took 30 minutes.

Scoring

There were 22 positive statements and 22 negative statements. The weightage given for positive statement was 1,2 and 3 for Yes, Undecided and No, while, in case of negative statements the weightage was given 3,2 and 1.

Interpretation

For interpretation criteria is given in the table

Table Interpretation criteria for mathematics anxiety scale

Score Range	Interpretation
Less than 61	Low Mathematics Anxiety
Between 61 and 92	Average Mathematics Anxiety
Above 92	High Mathematics Anxiety

Reliability

Reliability of Mathematics Anxiety scale was established with the help of Test-Retest Reliability Method and Split-Half Reliability Method by BASARAJ and SUVARNA. The Test-Retest reliability coefficient was found to be 0.80. And, the Split-half reliability coefficient was found to be 0.82. Since reliability coefficients found were high, so Mathematics Anxiety Scale was considered Reliable.

Validity

The Content Validity of the Mathematics Anxiety Scale was established by having a discussion with the expert from the fields of Psychology and mathematics.